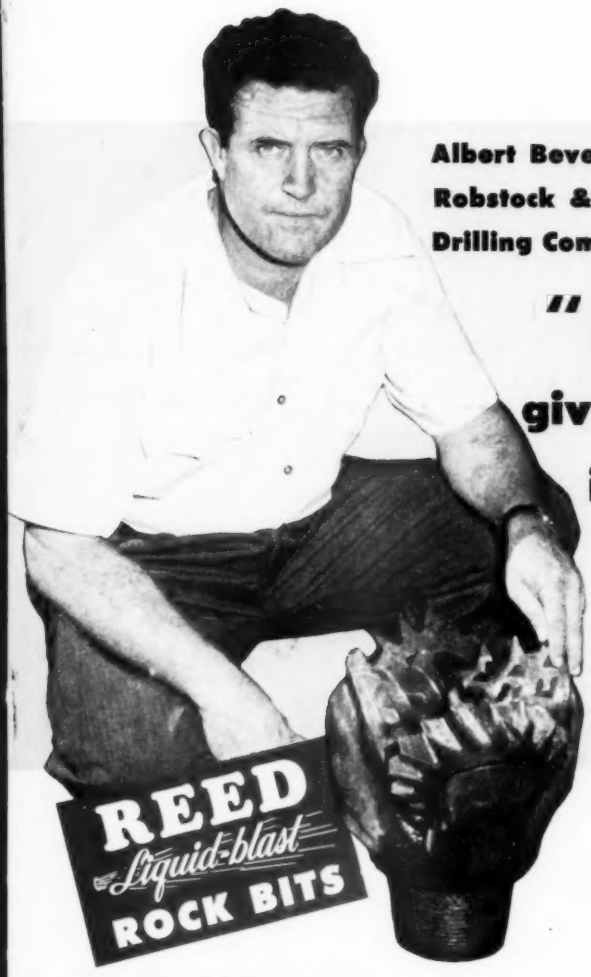
the OIL AND GAS JOURNAL



Albert Beveridge, tool pusher for Robstock & Reeves and Gulf Coast Drilling Company of New Orleans, says:

"REED Rock Bits give fast, straight hole in South Louisiana"

"Here in the soft formations of the South Louisiana coastal fields, we like REED LT Rock Bits for fast drilling and straight hole. They help us keep down drilling costs."

REED Liquid-Blast Rock Bits do a good job in soft formations because jets of drilling fluid clean both the cutters and the bottom of the hole.

REED ROLLER BIT COMPANY
HOUSTON 1, TEXAS

PRICE 50 CENTS TABLE OF CONTENTS PAGE 51 JUNE 7, 1951

A 100,000-bbl. Hortonspheroid used for natural gasoline storage by Warren Petroleum Corporation at their Norsworthy Terminal near Houston, Texas.

These HORTON TANKS Protect Your Reputation

If you are connected in any way with the production or sale of gasoline blending ingredients, you know the importance of preventing excessive volumetric losses during storage. Such losses have an adverse effect both on the quality of your product . . . and, unfortunately, on your reputation as a source.

These Horton tanks at the Norsworthy, Texas, terminal of the Warren Petroleum Company gives positive protection against volumetric losses from natural gasoline and butane during standing storage. The Hortonspheroid, *shown above*, stores natural gasoline and prevents excessive venting of the lighter fractions. The Hortonsphere, *shown at the right*, stores butane used to maintain seasonal volatility of gasoline. It successfully prevents the escape of butane.

Hortonspheres and Hortonspheroids are only two of the many Horton structures designed specifically for the protection of hydrocarbons during storage. For finished gasoline, we build Horton Floating Roofs, Hortondome Roofs, and Lifter Roofs to reduce evaporation losses from tanks used for standing storage or handling.

Write our nearest office for complete information and quotations when you need storage tanks of any type.

CHICAGO BRIDGE & IRON COMPANY

Now...Even Simpler Counterweight Adjustment!

BETHLEHEM
Quicker than ever; only two nuts to loosen on the weight assembly of most models.
Note also that one crank position is sufficient for all counterweight adjustments.
Socket wrench is applied here to turn pinion. Action of pinion (geared to rack) shifts the weight to desired point.

When first presenting its Series 50 pumping units, Bethlehem introduced the simplest, easiest, safest counterweight adjustment ever devised for this type of machine. It was a feature that had thoroughly proved itself under many gruelling tests . . . and one that continued to prove itself in the field, where it met with immediate success.

And now—adjustment of the weights has been further simplified by using only two binding bolts per weight on units through the 54-in. stroke, three bolts on units with 64-in. stroke, and four bolts on units with 74-in. and 86-in. stroke. In all cases these bolts are "in line" so that they are even more accessible than on the earlier models.

The operator, after loosening the bolts, merely applies his socket wrench to the end of a pinion shaft. He moves the wrench gently, with little or no effort, and the weight shifts position. Numbered graduations on the crank, and an index on each outer counterweight shell, facilitate adjustment.

It's all so effortless and safe! No climbing or scrambling. The operator stays on the ground, and there's nothing that can fall from the unit and hurt him.

For more details, call Bethlehem Supply—the office or store nearest you. Information will be furnished promptly.

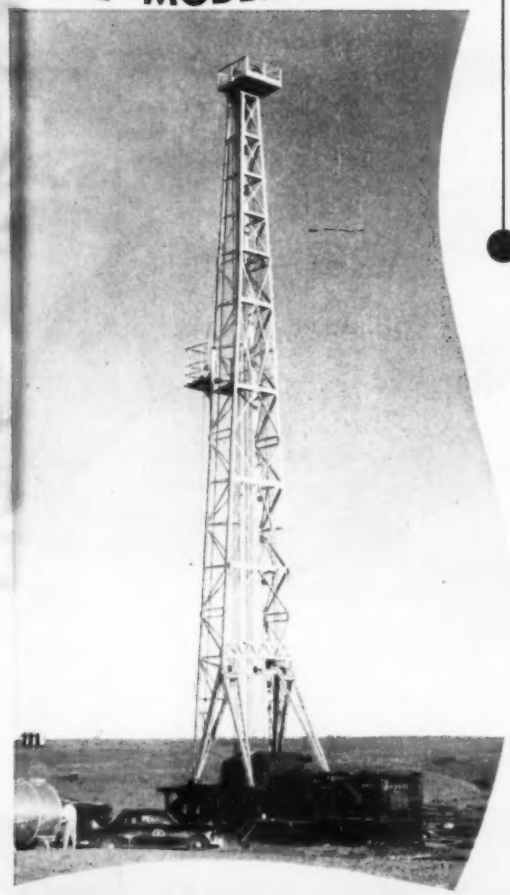
BETHLEHEM SUPPLY COMPANY

General Offices: 21 E. Second St., Tulsa, Okla.
West Coast Headquarters: Los Angeles, Calif.
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

MOORE CANTILEVER MASTS

THE MODERN WAY TO DRILL TO ANY DEPTH....



Lee C. Moore Masts are easy to move and erect. The variety of sizes makes it possible for you to select the one you need. There is a correct size for depths to more than 15,000 feet. Wherever oil is found Lee C. Moore Masts have proved to be the efficient, modern way to drill to any depth.

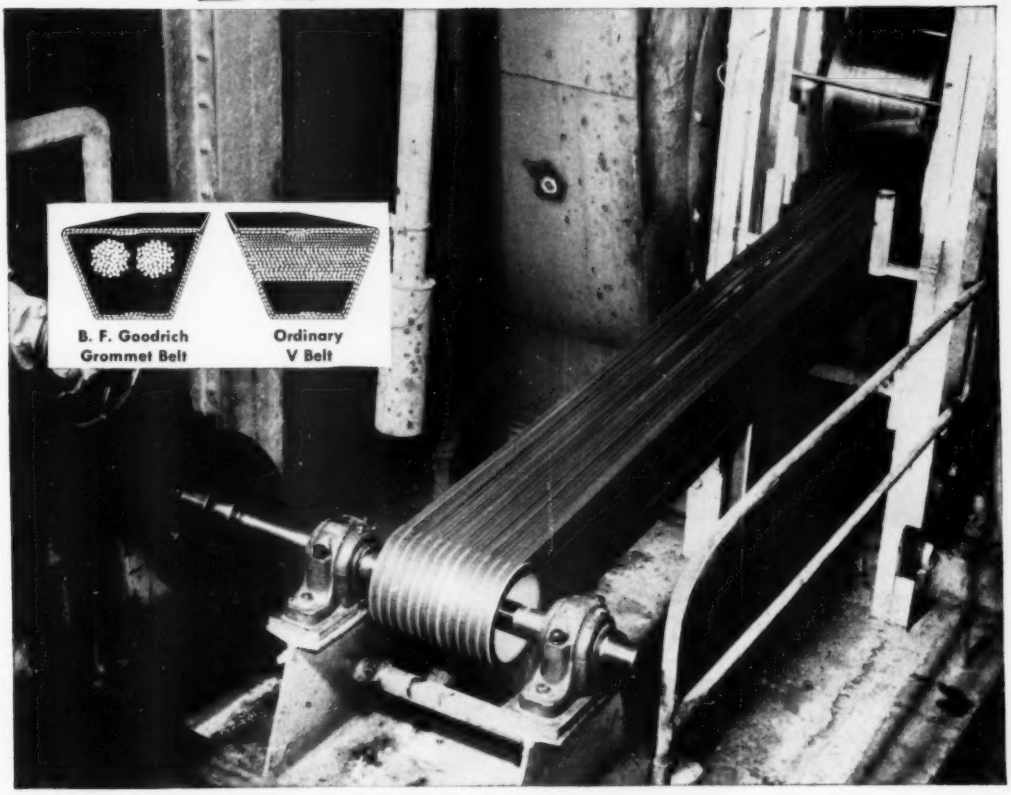
LEE C. MOORE

LEE C. MOORE CORPORATION

TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT • WICHITA • CENTRALIA • PITTSBURGH

Export Office — 9 Rockefeller Plaza, New York 20, N. Y.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Belt service tripled by changing to B. F. Goodrich grommet belts

B. F. Goodrich grommet V belts cut costs 20 to 50%

ORDINARY V belts on this drive (a big fan for drying grain) lasted 1674 hours. The company wanted to cut costs by getting longer life from belts so they called in a B. F. Goodrich man and B. F. Goodrich grommet belts were installed. Grommet V belts ran 5153 hours . . . more than three times longer than ordinary belts. Why is this a typical example of grommet belt performance — why do grommet V belts outlast other belts?

Endless — A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping cord sections. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless grommet belt eliminates such failures.

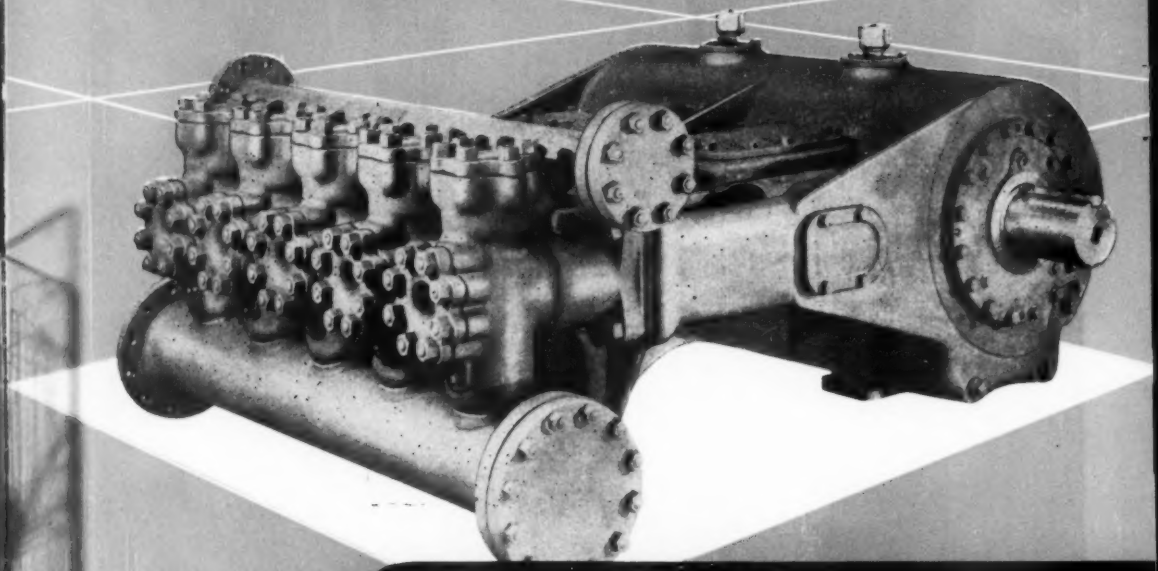
Concentrated cord strength — All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

Better grip, less slip — Because a grommet is endless, a grommet belt is more flexible, grips the pulleys better. Size for size, grommet belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B.F.Goodrich has the grommet! — No other multiple-V belt is a grommet belt (U. S. Patent No. 2,233,294). Now available in C, D and E sections. See your local B.F.Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B.F.Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

No. 558-P QUINTUPLEX Plunger Pumps . . . added to the "Oilwell" Line of Pumps



for Pipe Line Service

THIS new heavy-duty five-cylinder pump is designed specifically for pipe line service—to handle crude oil and products.

It is a high capacity pump with 8" stroke and 5" bore—capable of delivering up to 15,740 barrels per day at 1,000 p.s.i. discharge pressure—yet requiring floor space only 7' 2" long by 6' 4" wide.

The use of a separate speed reducer coupled to the crankshaft gives you complete freedom in the selection of prime-mover type and speed.

An in-line valve arrangement enables these pumps to operate at high efficiency on volatile products. Suction and discharge valves directly above and below the plunger chambers reduce volumetric clearance and eliminate air pockets. This feature also contributes to smoother operations when pumping heavier products, beyond the freedom-from-surge normally expected from five-cylinder pumps.

. . . with wide Operating Range to meet a variety of applications

Bbls. per hour...	218	327	436	545	656
Pump RPM	50	75	100	125	150
BHP Input	116	175	233	292	350

Call your nearest "Oilwell" Representative for help in selecting the right pipe line pump for your job . . . or write for the new "Oilwell" Pipe Line Pump Booklet—No. 13-51.

OIL WELL SUPPLY COMPANY

Branches Serving All Oil Fields

Executive Office—DALLAS, TEXAS
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USS TRADE MARK "OILWELL" TRADE MARK

UNITED STATES STEEL

piping maintenance *costs more* now!

Crane 150-Pound Steel Gate Valve

You spend less for it by using Dependable Quality

CRANE VALVES

. . . That's why more Crane Valves are used than any other make

Steel valves that stay on the job

You can practically forget valve maintenance worries with Crane Cast Steel Wedge Gates. They're unusually rugged . . . amply reinforced at all stress points. Disc is precision-guided to reduce seating surface wear. Straight-through ports give smooth flow, with minimum turbulence and erosion.

Stuffing box depth and design assure tight stem seal . . . long packing life. Valves available in trim materials for steam, water, gas, oil, and oil vapor services.

Ask your Crane Representative about the better quality and greater dependability of Crane valves—your assurance of on-the-job performance that spells lower final cost.

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The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951.

PHOTOGRAPHS OF CORES PROVE MICROLOG DETAIL

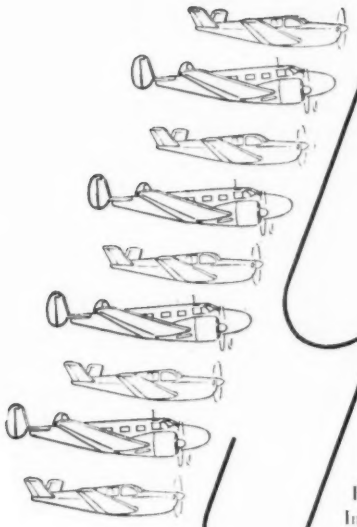
The Microlog records the restivities of micro-volumes of formation along the face of the bore hole. For this reason it gives precise lithological detail. It indicates with equal precision those formations which are permeable and porous enough to have reservoir possibilities.

Actual photographs of cores reproduced here substantiate Microlog detail. A Microlog recorded in the cypress sand, Louden Field, Illinois, has been expanded to fit photographs of the cored section. The resulting record is an interesting study in formation detail which cannot be duplicated by any other logging method.

Porosity and permeability records are also reproduced. The correlation between these measurements and the Microlog values confirm the ability of the Microlog to indicate the producing horizon with amazing detail.

SCHLUMBERGER WELL SURVEYING CORP.

HOUSTON, TEXAS

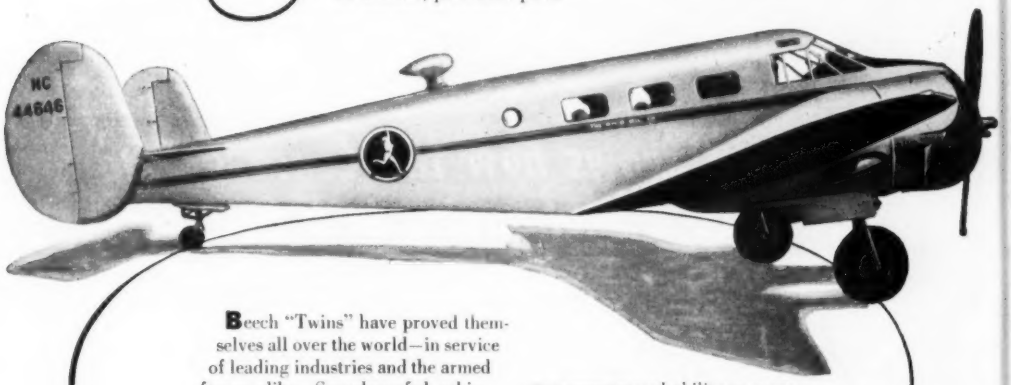


9 WAYS

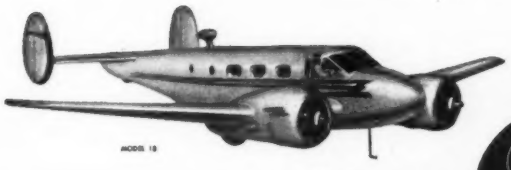
Ohio Oil Company personnel save days, dollars...and energy

The Ohio Oil Company keeps nine Beechcrafts on the go—five Bonanzas, four Executive Transports.

States the manager of Ohio's aviation department: "It takes just four hours from Findlay, Ohio, where most of our Beechcrafts are based, to our division office at Tulsa, Oklahoma. In our fast-moving business, Beechcrafts let us set an efficient, profitable pace."



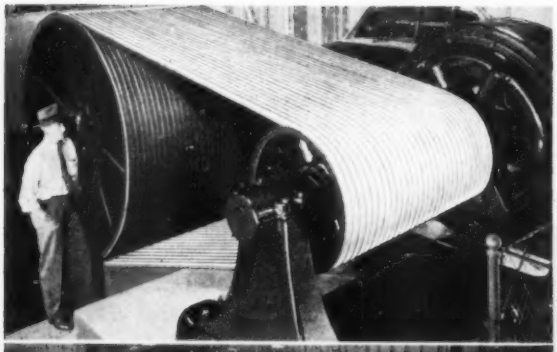
Beech "Twins" have proved themselves all over the world—in service of leading industries and the armed forces alike. Soundproofed cabin and custom-interior plans insure fatigue-free travel. Exceptional speed (maximum 230 mph) and any-season dependability give key men unsurpassed ability to move—*fast*. For full information see your Beechcraft distributor. Or write to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

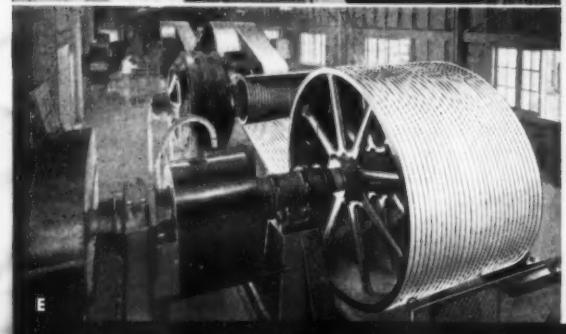


- Cruising speed, 200 mph
- Range up to 900 miles
- Service ceiling, 20,500 ft.
- Seating arrangements for 7, 8 or 9

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS





These 750-horsepower and 1000-horsepower Gates Vulco Rope Drives were originally installed in a West Coast butadiene plant in 1942 and ran nearly 5 years until the plant closed down. That plant is now running again—and the **original** Gates Vulco Ropes are once more producing the synthetic rubber so badly needed at this time.

This test shows how the Concave Side gives you a real saving in V-Belt costs

If you are interested in lower operating costs, make this simple test:—

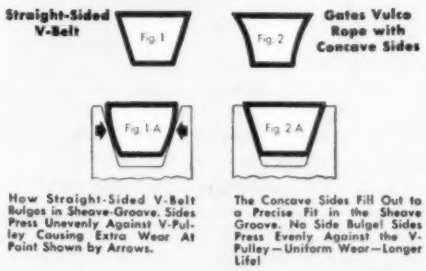
Take *any* V-belt and bend it as it bends in going around a pulley. As the belt bends, grip its sides with your fingers and thumb. You will *feel* the sides of the belt *bulge out!*

This bulging gives a straight-sided V-belt the shape shown in figure 1-A. (See diagrams at right.) Clearly, this shape does not fit the sheave groove. The sides of the bulging belt are forced to press unevenly against the V-pulley—and this concentrates the wear along the *middle* of the sides.

But when you bend a V-belt that is built with the *Concave Side*, you find that the sides become perfectly straight—as shown in Figure 2-A. This shape precisely fits the sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the *full* face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure you get the V-belt with the Concave Sides—The Gates Vulco Rope!

CS-514

Gates
Hose V-Belts Molded Rubber Goods for Industry

VULCO ROPE DRIVES
ENGINEERING OFFICES AND JOBBER STOCKS IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY
DENVER, U. S. A.
The World's Largest Makers of V-Belts

ASK THESE 10 QUESTIONS
before you buy a diesel engine!

1 Is it a "true" diesel?

2 Does it have unit fuel injection?

3 Does it have four valves per cylinder?

4 Does it have distortionless pistons?

5 Does it have interlocking rods?

6 Does it have an extra heavy crankshaft?

7 Does it have dual overhead camshafts?

8 Are the camshafts driven from the flywheel end?

9 Does it have an integral hydraulic servo-type governor?

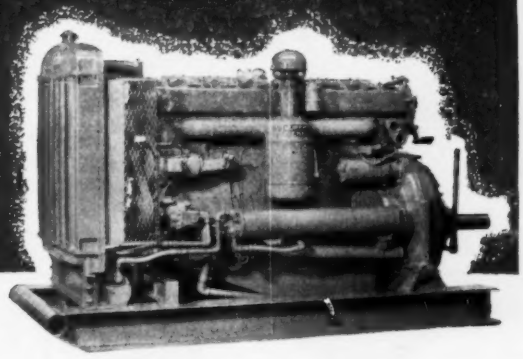
10 Is the cylinder block symmetrical?

ASK these questions of any diesel engine salesman and you'll find that only the Murphy Diesel Salesman can answer "Yes" to all of them. From an operating standpoint ten "Yeses" mean you'll get more power, greater economy, greater dependability and longer engine life . . . just what you get with Murphy Diesels. Full information is given in the booklet *"10 Questions to Ask a Diesel Engine Salesman."* Ask your Murphy Diesel Dealer for a copy or write direct.

MURPHY DIESEL

Heavy duty power
for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.



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5305 W. Burnham St., Milwaukee 14, Wisconsin
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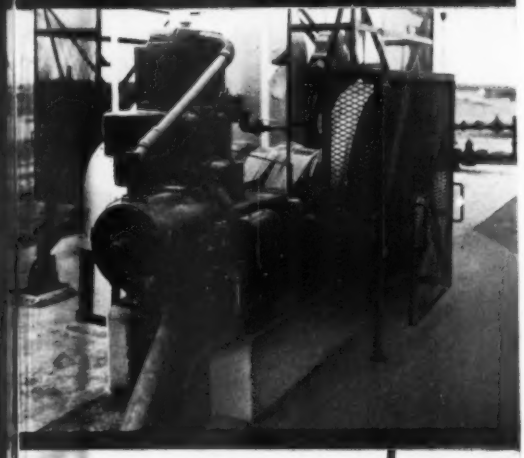
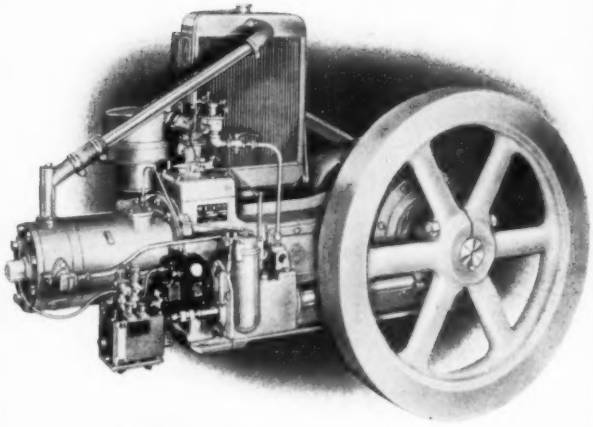


CHOSEN BEST

by *Comparative Test!*



Ajax

GAS and OIL ENGINES

Every month, more of the steady stream of AJAX Engines rolling to every field are *ordered on the basis of exacting comparative performance analyses.*

In every instance that has come to our attention, where careful checks have been made on operating economy, maintenance costs, ease of servicing and all-around dependability—*AJAX leads.* Such tests confirm the practical experience of Ajax users everywhere. Talk it over with your Supply Man!

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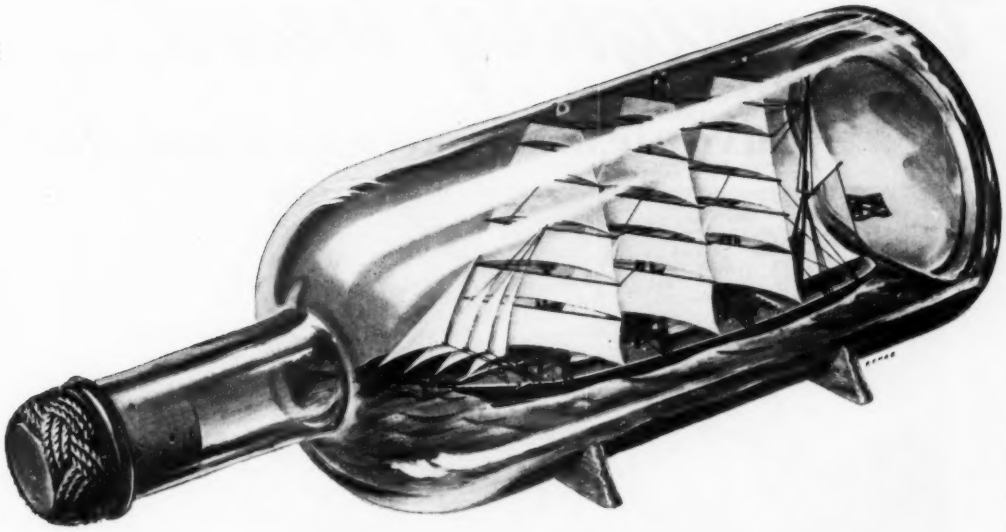


It's craftsmanship that counts

THIS example of craftsmanship symbolizes something that every producer of quality line pipe must know: *Painstaking care is essential.*

Such craftsmanship is fundamental at Kaiser Steel, where every step in production is completely and rigidly controlled. The result is steel pipe which measures up to the precise specifications of the gas, oil and water industries.

Such painstaking attention to quality is another reason why experienced line men know they can rely on Kaiser Steel pipe!

Kaiser Steel Pipe is manufactured to conform to latest API specifications—in diameters from ½ inch to 30 inches, and in lengths up to 55 feet. Shipping points are Fontana and Napa, California.

It's good business to do business with

Kaiser Steel

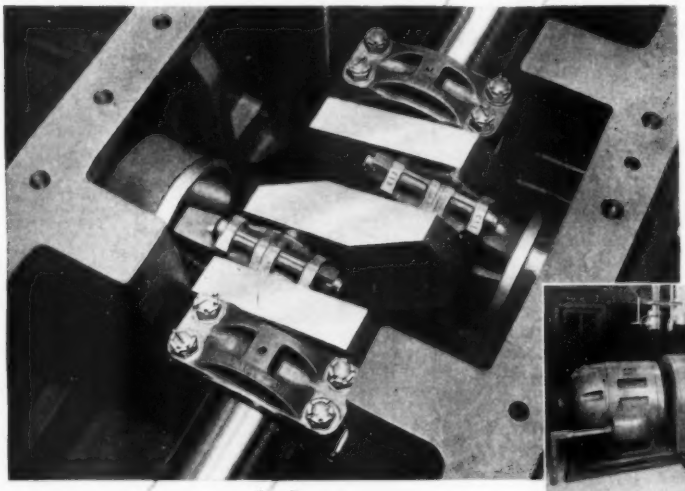
KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

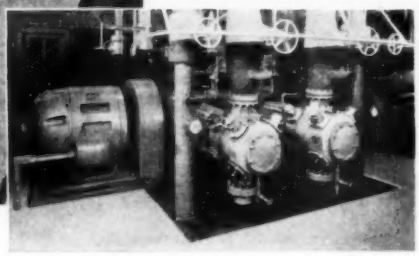
Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅛" to 12¾" O.D.	Up to 55'	.188" to .400"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	22" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • KAISER STEEL CORPORATION Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York

the mighty heart...

THAT IMPARTS UNRIVALED DURABILITY





Clark CMA-4, 300 bhp, 600rpm, balanced/opposed, motor driven compressor in chemical company dry ice plant.

Rugged, smooth-functioning and vibration-free, this is the mighty heart that imparts unrivaled durability to Clark Balanced/Opposed, Motor-Driven Compressors.

With a sturdy, generously proportioned, one-piece forged steel crankshaft, to assure a full lifetime of continuous service . . . with cylinders mounted on opposite sides of the crankcase and driven from adjacent 180° opposed crankthrows, to cancel out all unbalanced forces (without use of counter weights) . . . it's easily understood why the Clark CMA balanced/opposed design "belongs" wherever air or gas must be compressed. For, its smooth, vibration-free performance holds down foundation size, installation and maintenance costs, while its compactness reduces floorspace requirements.

Clark balanced/opposed compressors are available in a range of sizes from 150-4500 bhp. Full data and literature are available from your nearest Clark representative.

MIDGET ANGLE • RIGHT ANGLE • BIG ANGLE
ELECTRIC-DRIVEN • CENTRIFUGAL

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SEE the difference in

CLARK

Balanced/Opposed COMPRESSORS

where you need these proved

MAGCOBAR Products

LOST CIRCULATION

Magcobar has developed these specific "formation plugging" agents which effectively combat and correct conditions that contribute to loss of drilling fluids to the formation. In developing these products, Magcobar has given first consideration to materials that will form an impervious bridge in fissures, cracks or holes, without fouling the valves and other working parts of the mud circulating pumps. Magcobar also has available several plastic mud plugging agents for special problems. When you detect loss of circulation, call your Magcobar field engineer for assistance and order out the Magcobar material of your choice from the Magcobar dealer nearest you. There are now more than 300 strategically located dealers to serve you, night and day with Magcobar's line of complete Drilling Mud Service.

ALWAYS KEEP A FEW SACKS OF THESE MATERIALS AT THE RIG! IT'S GOOD INSURANCE AGAINST COSTLY DELAY AND HOLE HAZARDS.

—Contains strong, hair-like fibers which form an impervious mat through which mud will not pass.

—Contains thin flakes of carefully sized muscovite mica.

—Especially prepared cellophane in flake form.

—A free-flowing blend of correctly sized Douglas Fir Fibers.

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MALVERN, ARKANSAS • HOUSTON, TEXAS

One of the Dresser Industries

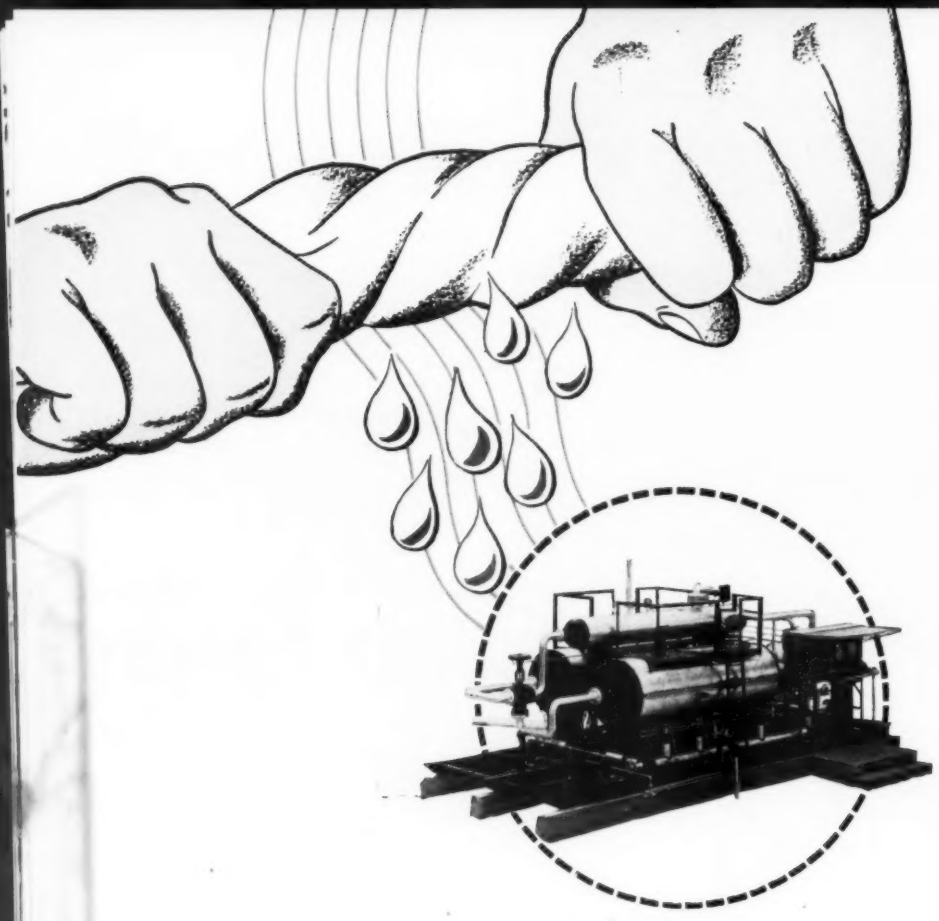
Magcobar

Complete

DRILLING MUD SERVICE

DEALER

MAGCOBAR . . . THE PIONEER OF FAIR AND REASONABLE MUD PRICES . . . HAS COMPLETED ITS FIRST DECADE OF SERVICE TO THE OIL INDUSTRY



Wring It Dry...
AVOID FREEZE-UPS

• Transverse flow assures minimum pressure drop, in the BS&B Granular Type Gas Dehydrator. EXCLUSIVE HORIZONTAL SORBERS are compartmented for efficient operation at either FULL OR LOW CAPACITY! Built-in additional gas scrubbing capacity. Engineered for lower fuel consumption, greater desiccant contact efficiency and increased desiccant life. Desiccant more easily filled and removed. Automatic operation with dependable BS&B controls. Skid mounted for low-cost installation.

Dehydrate your gas the economical, efficient, dependable BS&B way. Standard units for one million up to fifty million feet capacity are available. BS&B has and is ready to design and produce larger units. Write today for catalog and full details.

BS&B has grown with the Petroleum Industry, designing and manufacturing efficient, dependable equipment for over 57 years. BS&B leadership continues, now and in the future!

BS&B

DRY TYPE
DEHYDRATOR

BLACK, SIVALLS & BRYSON, INC.

Oil and Gas Equipment Division, 2131 Westwood Blvd., Rm. 1A
Oklahoma City, Oklahoma

IVAN is watching you

IVAN is a dyed-in-the-wool Communist. There are only 6 million party members like him in all Russia, yet these Communist brass-hats enforce the iron dictatorship of the Kremlin over *200 million* Russians.

He's sold to the hilt on Red ideas. Which means he's out to get *you*. He believes it's either you or him . . . that the world is too small for both.

Ivan is working hard to beat you down. He has a big head start.

Right now he's got you in a bad spot.

Ivan is afraid of only one thing.

He fears your ability to out-produce him in guns, tanks, planes.

Frankly, he doesn't think you value your free system enough to do it . . . to make willingly the sacrifices he has squeezed out of the Russians.

But he's wrong!

Because you and all of us have set out to build more and better weapons—to do it faster all the time.

We must use every bit of know-how and inventive skill we have to improve our machines and methods—to turn out more and more for every hour we work. Only in this way can we become militarily strong.

But we've got to supply essential civilian needs as well. We can't allow needless shortages to take prices skyrocketing and lower the value of our dollar.

Sure, that means sacrifices for everybody. But doing this double job well is the only sure way to stop Ivan in his tracks—and to save the freedoms which are ours and which he has never known.

FREE . . . this important booklet tells you how our American System Grew Great

How Americans developed better machines, power and skills to build a great nation . . . Why we have been able to produce constantly more per hour . . . How this has given us the world's highest living standard.

How we can meet today's challenge—Why we must expand our productive capacity . . . supply arms and essential civilian needs, too. Read how this dynamic process works in free booklet, "The Miracle of America," endorsed by representatives of management and labor. Send for your free copy today!

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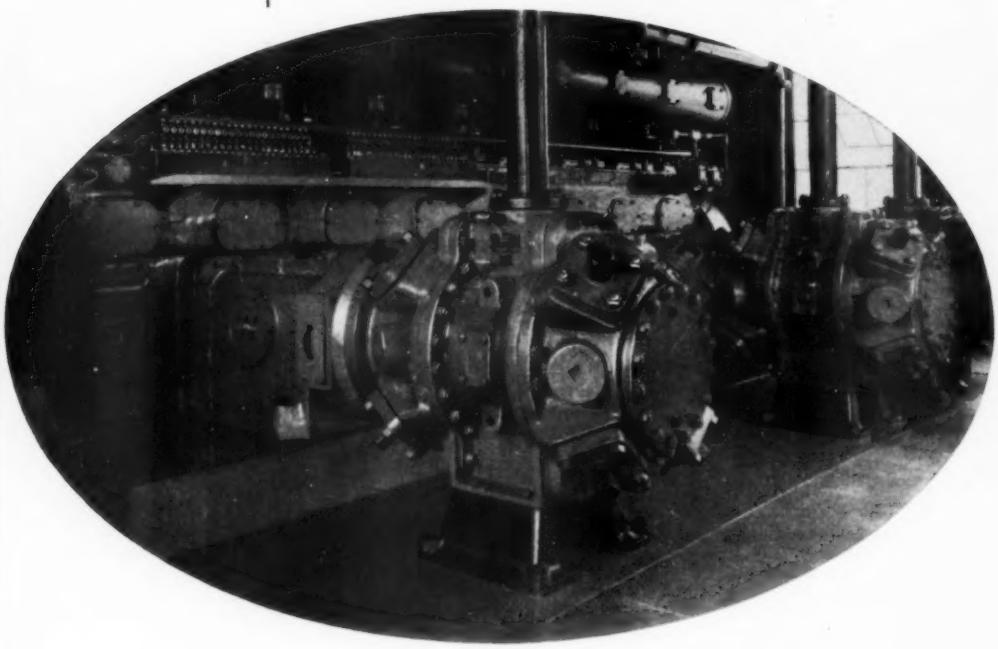
THE OIL AND GAS JOURNAL
Tulsa 1, Oklahoma

THE BETTER WE PRODUCE
THE STRONGER WE GROW

Insure dependable performance of pipe-line compressor units, reduce maintenance costs with **Gulf Security Oil**



You make a two-way savings when your pipe-line compressor units are lubricated with Gulf Security Oil—lower maintenance costs, less out-of-service time.

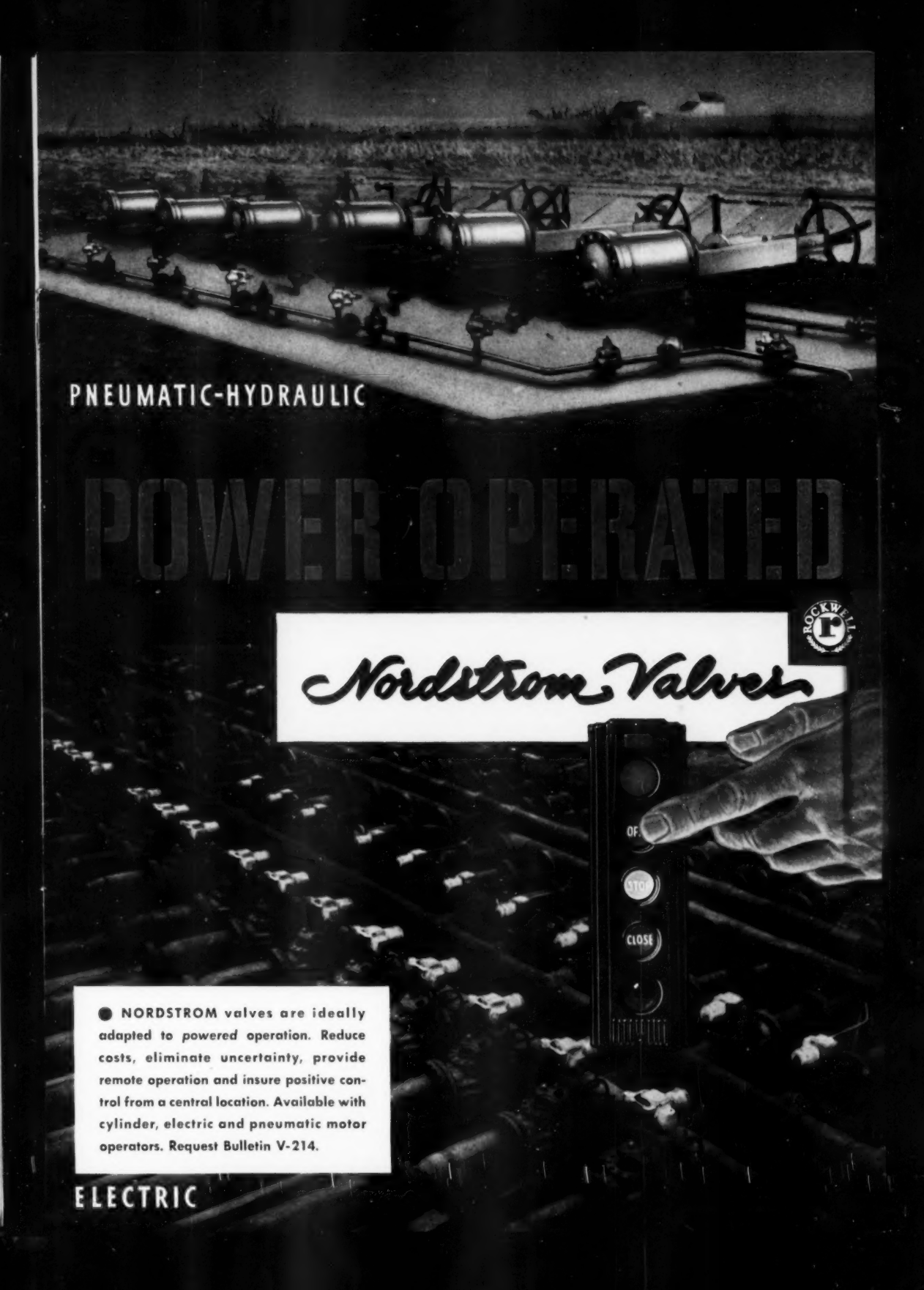
Gulf Security Oil provides outstanding protection for bearings and cylinder walls in both engines and compressors. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without appreciable change in its original properties. And because oil control rings are kept clean, oil consumption is remarkably low.

Many operators of units lubricated with Gulf Security Oil report that this quality oil insures more operating hours between overhauls and helps them avoid unscheduled shutdowns. And Gulf's delivery service is tailored to meet the needs of every pipe-line operator.

For complete information on Gulf Security Oil and for expert help on any lubrication problem, call in a Gulf Lubrication Engineer today. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh 30, Pa.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS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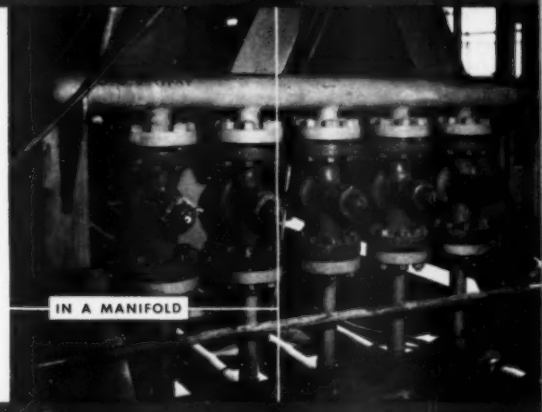
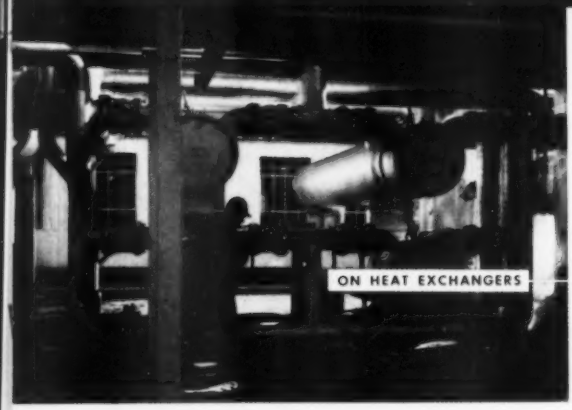
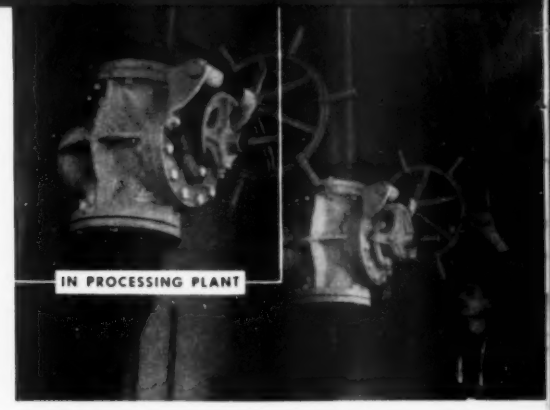
POWER OPERATED
ROCKWELL
Nordstrom Valves
OPEN
STOP
CLOSE
● NORDSTROM valves are ideally adapted to powered operation. Reduce costs, eliminate uncertainty, provide remote operation and insure positive control from a central location. Available with cylinder, electric and pneumatic motor operators. Request Bulletin V-214.
ELECTRIC

You'll find NORDSTROMS everywhere



Replace ineffective valves with NORDSTROMS





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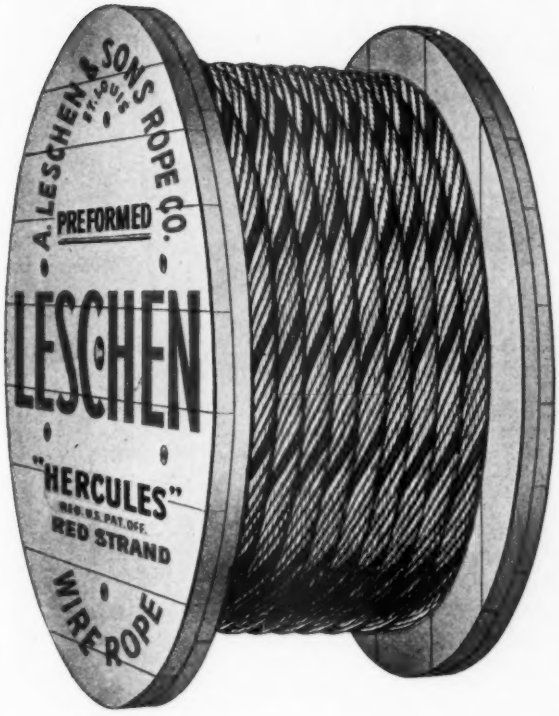

the greater the need for

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WIRE ROPE

Its fitness for tough work has been proved by many years of actual on-the-job performance. Strength, toughness, flexibility, and durability . . . *in correct balance* . . . provide safe, dependable, and economical wire rope service.

"HERCULES" (Red-Strand) Wire Rope was originated by Leschen in 1886 to meet the rope requirements of bigger, better material handling equipment—and tough jobs have been its proving grounds ever since.

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Round Strand or Flattened Strand – Preformed or Non-Preformed – Wire Rope Core or Fiber Core. Let us help you select the *right* rope for your job.

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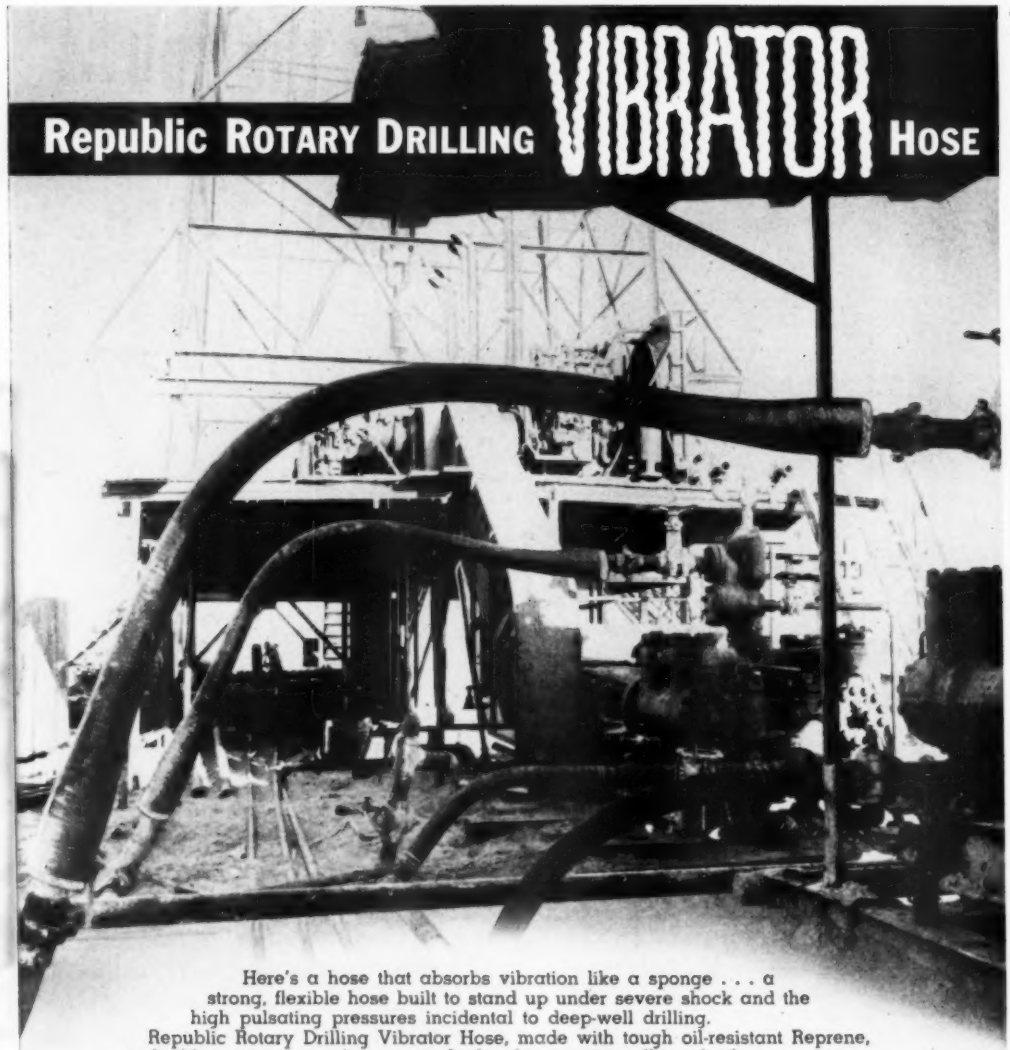
Republic ROTARY DRILLING VIBRATOR HOSE



Here's a hose that absorbs vibration like a sponge . . . a strong, flexible hose built to stand up under severe shock and the high pulsating pressures incidental to deep-well drilling.

Republic Rotary Drilling Vibrator Hose, made with tough oil-resistant Reprene, is highly resistant to abrasion and the deteriorating effect of oil.

Flexible steel muscles give Republic hose maximum resistance to pressure and protection against distortion. The patented Boltless Coupling, streamlined to the bore and shape of the hose, assures a leak-proof union and a snag-free hose.

Republic Rotary Drilling Vibrator Hose is supplied in standard 10, 12, 15, 20 and 25-ft. lengths complete with coupling. Every length is designed to withstand a test pressure up to 5,000 psi upon delivery. Contact your Republic Distributor or write direct for further information.

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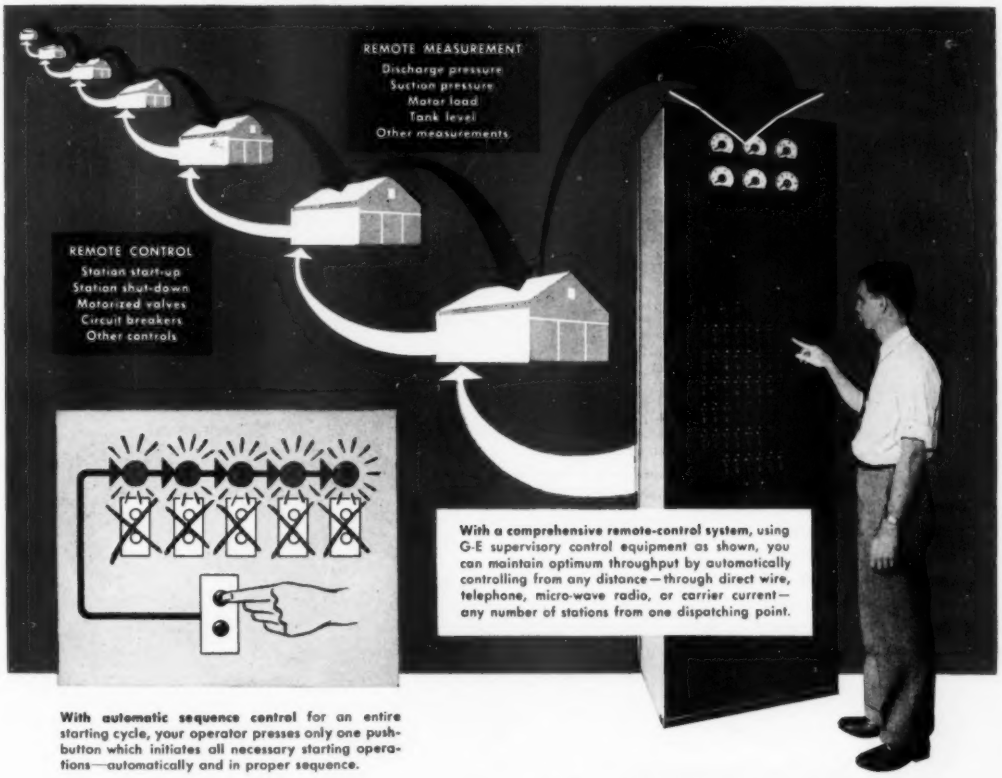
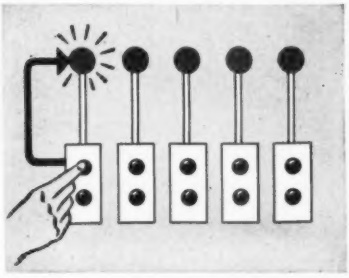
"GO AUTOMATIC" AS FAR AS YOU LIKE



With a comprehensive remote-control system, using G-E supervisory control equipment as shown, you can maintain optimum throughput by automatically controlling from any distance—through direct wire, telephone, micro-wave radio, or carrier current—any number of stations from one dispatching point.

With automatic sequence control for an entire starting cycle, your operator presses only one push-button which initiates all necessary starting operations—automatically and in proper sequence.



With convenient push-button operation, your operator controls individual motors from any desired location. Interlocking of control can take the responsibility for starting and stopping valve motors, blower motor, and main pump motor in proper succession.

. . . with AUTOMATIC G-E SYSTEMS

for all types of pipeline pumping control!

Automatic control of pipeline pumping—to any degree desired—can be easily, efficiently arranged with General Electric control equipment. You can provide it simply by using individual push-buttons to operate each motor in a main-pump starting cycle. You can go further and put an entire starting cycle under automatic single push-button sequence control, or employ instrumentation to make the station self-operating. You can also place your whole pipeline under remote control of your dispatcher with a comprehensive supervisory control system.

Automatic operation—saving manhours and increasing over-all efficiency—is only one of many ways G-E pipeline electrification can cut your costs. To electrify most efficiently and economically, **see your G-E representative first.** *General Electric Company, Schenectady 5, N. Y.*

Everything you need
to cut oil pipeline costs
—ELECTRICALLY!

GENERAL ELECTRIC

CHAPMAN

Steel Valves Score on all 3 Points

1

CHAPMAN STEEL VALVES have the high precision ratings of custom-made valves — but the economy of production-line manufacture.

2

CHAPMAN STEEL VALVES are made exclusively from quality-controlled steels developed and produced in Chapman's own foundries under control of Chapman's own outstanding metallurgists.

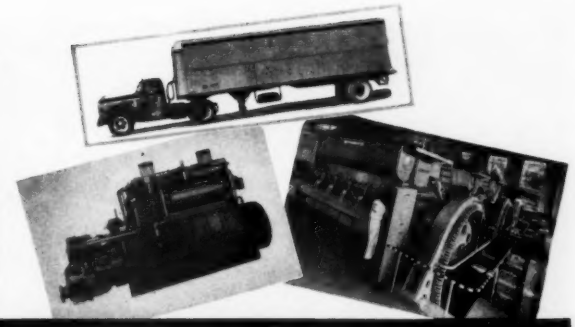
3

CHAPMAN STEEL VALVES are designed to equal or surpass — A.S.A. and A.P.I. Standards in all pressures and temperature ranges.

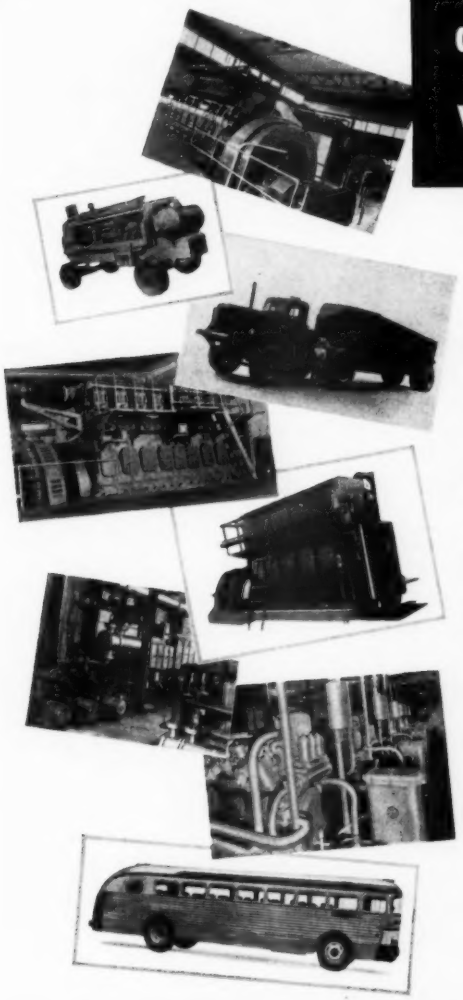
Be sure to see Chapman first whenever you need steel valves — gate, globe, angle or check. As a result of Chapman's long years of research and experience, they are tops in every respect.

The Chapman Valve
MANUFACTURING COMPANY
INDIAN ORCHARD, MASS.

a big selling point with diesel builders



and a big buying point with diesel users



Unobserved on many a Diesel, yet vital to its performance . . . the exchangers entrusted with the critical responsibility of lube oil or jacket water cooling, or both.

And because that component can help build a Diesel's reputation for sustained operating efficiency, or quickly cancel it through its own inadequacy, engine builders are and *must* be extremely discerning in their selection.

That's why today, as for years past, on most every Diesel installation, you'll find either built-in to the engine itself, or located in a convenient spot, *a Ross Exchanger*. It's standard with the best names in the industry . . . names like Caterpillar, Nordberg, Cummins, Cooper-Bessemer, Fairbanks-Morse, Worthington, Ingersoll Rand and others . . . names that have reputations to protect in the factory, on the farm . . . on pipelines, in power plants . . . in mines, on minesweepers . . . in oil drilling and oil refineries . . . in cotton gins and chemical plants, utilities, on ski lifts, to mention a few.

Yes, consistently you'll find Ross Exchangers relied upon to carry the burden of temperature protection for engines of any rating. They're a big selling point with Diesel engine builders . . . a big buying point with users. And as you may expect, like most Ross units, they're fully standardized, saving considerable in design problems, engineering, fabrication and installation. Full details in illustrated bulletins, on your request.

ROSS HEATER & MFG. CO., INC., Div. of American Radiator & Standard Sanitary Corp., 1417 West Ave., Buffalo 13, N. Y. In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

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AMERICAN STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

Big Sheaves

for Uninterrupted Production

TO GET CONTINUOUS, dependable slush pumping, sheaves for applications from 100 to 1000 horsepower or higher can be built right in Allis-Chalmers own foundry and machine shops. They are built with any number of grooves you need, for A, B, C, D, or E belts.

And, if required, large size *Texrope* sheaves can be equipped with special *Magic Grip* bushings that give you fast, easy mounting and alignment. *Magic Grip* bushings cannot slip or jam — yet they can be removed more quickly than other types.

Extra Engineering Skill

You get extra engineering skill both in field and factory because of Allis-Chalmers wide experience in multiple V-belt applications. There are more *Texrope* drive installations than any other type of multiple V-belt drive. This experience means better, more efficient manufacturing plus improved application engineering.

To speed delivery, *Texrope* sheaves in the large sizes needed for slush pump operation are stocked in the heart of the oil fields. Also, *Texrope* belts for all your multiple V-belt needs are available at dealers located throughout the oil fields. For fast, convenient service, call your nearest *Texrope* drive dealer or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-3414

Genuine *Texrope* V-belts and Drives are available through dealers in any of these cities:

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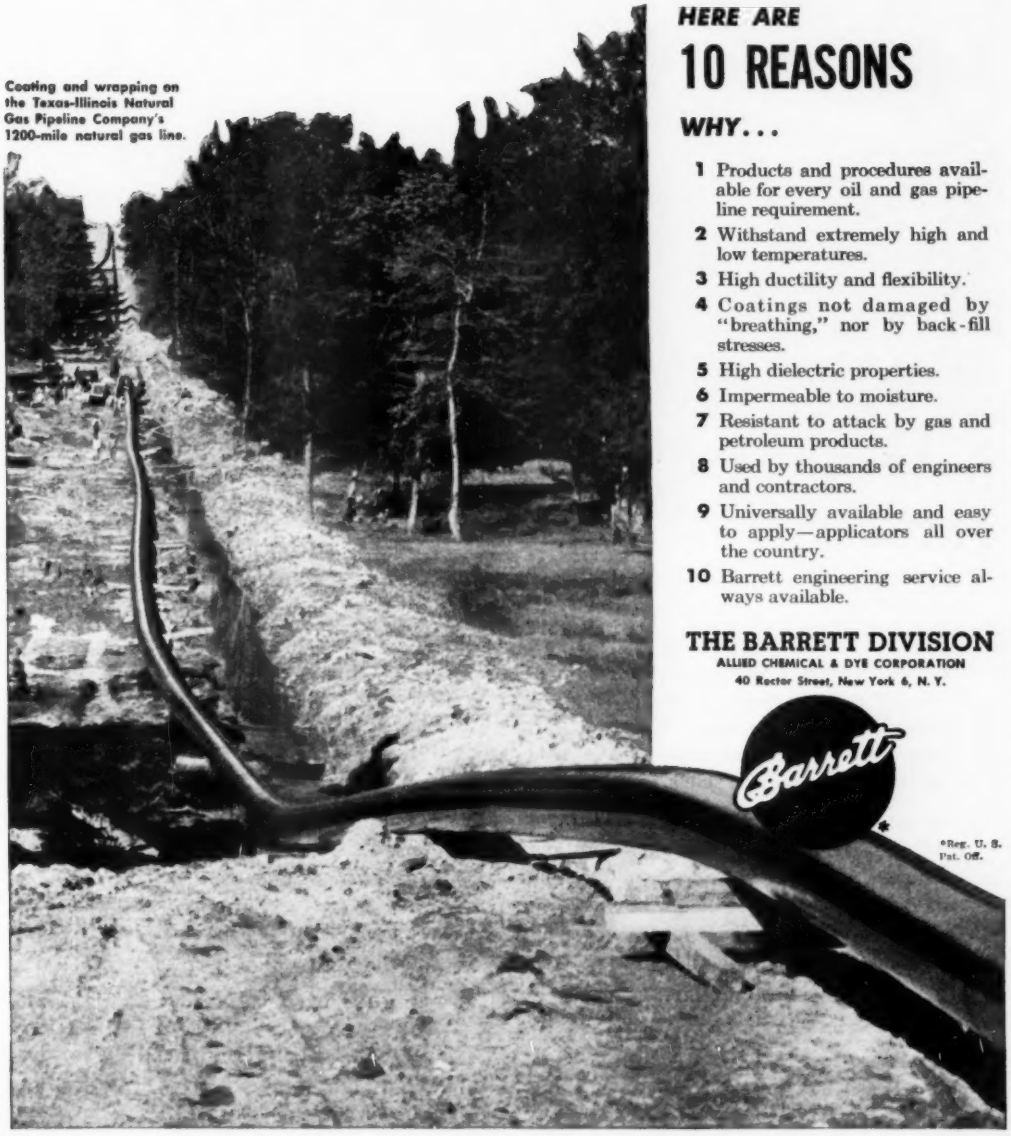
BARRETT* COAL-TAR ENAMELS

PROTECT

AMERICA'S GREATEST PIPELINES



Coating and wrapping on the Texas-Illinois Natural Gas Pipeline Company's 1200-mile natural gas line.

HERE ARE

10 REASONS

WHY...

1. Products and procedures available for every oil and gas pipeline requirement.
2. Withstand extremely high and low temperatures.
3. High ductility and flexibility.
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5. High dielectric properties.
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8. Used by thousands of engineers and contractors.
9. Universally available and easy to apply—applicators all over the country.
10. Barrett engineering service always available.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
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Barrett

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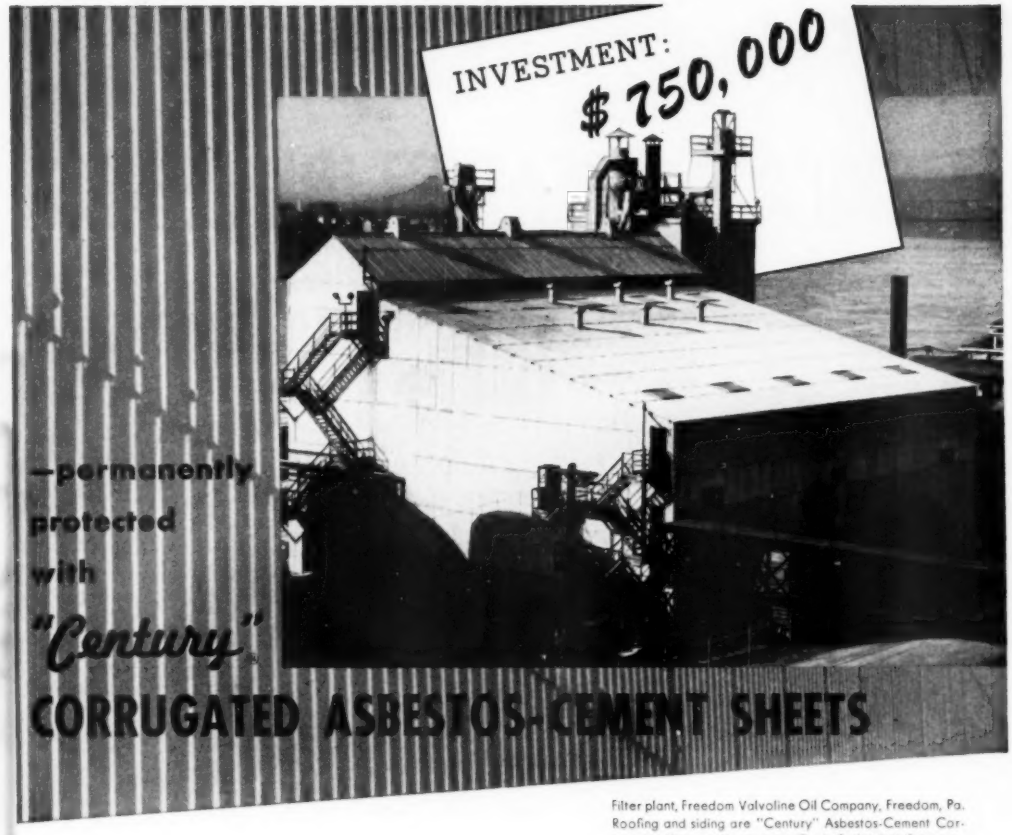

Filter plant, Freedom Valvoline Oil Company, Freedom, Pa. Roofing and siding are "Century" Asbestos-Cement Corrugated. Erection Contractors: Elwin G. Smith & Company.

THIS modern filter plant of the Freedom Valvoline Oil Company, Freedom, Pa. is typical of the many progressive industrial plants throughout the nation where "Century" Corrugated Asbestos-Cement Sheets have been used for both roofing and siding.

The choice of "Century" Asbestos Corrugated is a logical one wherever quick application and maintenance-free service are desired. "Century" Asbestos Corrugated goes on quickly, inexpensively. The large-size sheets are exceptionally strong, but they can be cut and drilled easily—fastened in place with a minimum of labor.

And the protection is permanent! "Century" Asbestos Corrugated resists weather; *can not burn*, rot, or rust. Rodents and termites can't hurt it. It doesn't even need protective painting to preserve it!

Whatever your building plans—new construction, modernization, expansion—get the cost-saving story of "Century" Corrugated Asbestos-Cement Sheets. We'll gladly send complete data on request.

Nature made Asbestos...
Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

FOR sheer toughness there's no other protective coating like Pittsburgh's TANKHIDE!

● **The petroleum industry** has for many years recognized the advantage of using light colored tank paints to minimize the evaporation loss of volatile liquids. With its unusually high heat and light reflection characteristics, Pittsburgh's Synthetic White TANKHIDE prevents the excessive heat absorption that brings about waste by evaporation.

● **Not only** is evaporation loss held to a minimum, but the brilliant white appearance of TANKHIDE is maintained throughout its long life by its self-cleaning action.

● **TANKHIDE** is a combination of intensely white titanium pigments and weather-resistant vehicles which make it a durable, lasting metal protective coating. It is designed for one-coat hiding. TANKHIDE can also be brushed where spraying is not possible.

● **The quick set** and firm character of the film during the drying period not only prevent the collection of dirt and insects but also keep damage due to rain, scuffing and abrasion at a minimum.

● **TANKHIDE** is also available in synthetic gray and black as well as in gray and black oil-base coatings for various purposes. These can be used on wood and metal surfaces with equally good results.

● **Pittsburgh** also offers a wide variety of quality finishes for every need in the petroleum industry. These include IRONHIDE, specially designed for the decoration and preservation of iron and steel structures; METALEAF Aluminum Paints with high light and heat reflecting value; service and bulk station paints; pump enamels and drum finishes.

● **Call on us** for expert advisory service. Our wide experience in supplying finishes for the petroleum industry can be helpful and save you time and money.

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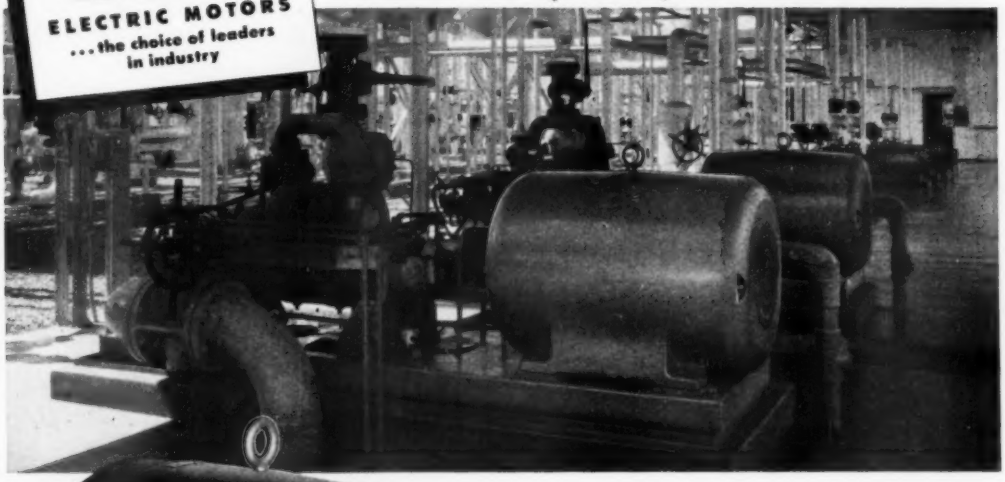
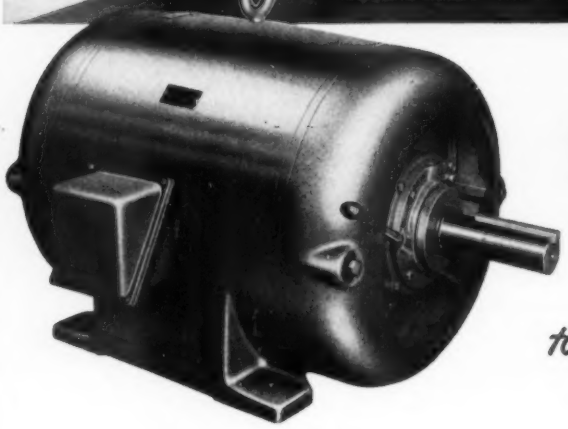
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PG **PITTSBURGH** *Industrial* **FINISHES**
PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS
PITTSBURGH PLATE GLASS COMPANY

Wagner
ELECTRIC MOTORS
... the choice of leaders in industry

Built for your protection...





Wagner

Cast-Iron Frame MOTORS

totally enclosed...fan cooled ...corrosion-resistant

These totally-enclosed fan-cooled motors are built to take it—destructive elements, dirt or dust, acids or fumes don't interfere with their dependable operation.

Wagner cast-iron motors are especially suitable for installation in steel mills, mines, chemical plants, refineries and for other applications where corrosion is a problem, because practically all exposed parts are made of heavy, corrosion-resistant cast iron.

Where protection against explosive atmospheres is required, an explosion-proof design (type JP) can be furnished. Both the standard totally-enclosed type and the explosion-proof type are available in ratings from 2 to 250 horsepower, with either normal torque or high torque characteristics.

Wagner's new Bulletin MU-132 gives complete information on these fully-protected motors. Write for your copy today. Thirty-one branch offices, located in principal cities, are ready to assist you in any motor application problem.

Wagner Electric Corporation 1891 1951

MBI-10

WAGNER ELECTRIC CORPORATION
6389 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 31 PRINCIPAL CITIES

January 18, 1907 OIL INVESTOR'S JOURNAL

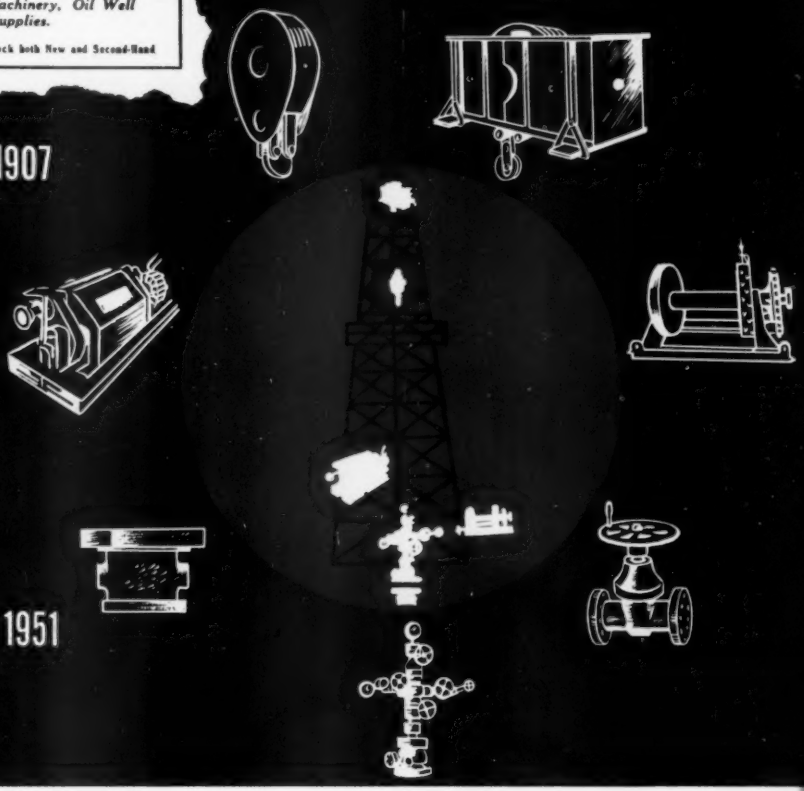
BEAUMONT IRON WORKS, INC.

BEAUMONT, TEXAS

Manufacturers of Complete Rotary Drilling Rigs. Standard Rig Irons, Oil Well Machinery, Oil Well and Pipe Line Supplies.

We carry Boilers, Engines and Pumps in Stock both New and Second-Hand

PRODUCING IN 1907



. . . . PRODUCING IN 1951

BIW Rotary Drilling & Production Equipment *for fast, low-cost operation*

Today—enriched by nearly a half century of experience—BIW continues to produce a wide variety of equipment including drawworks, crown and traveling blocks, wellhead assemblies, coring reels and other equipment of high quality design and fabrication.

A specialty product is the Atlas-Hughes non-lubricated valve for Christmas tree and other oilfield uses. For information on all BIW drilling and production equipment, get in touch with your nearest Atlas Engineering Works representative.

exclusive sales agents

ATLAS ENGINEERING WORKS

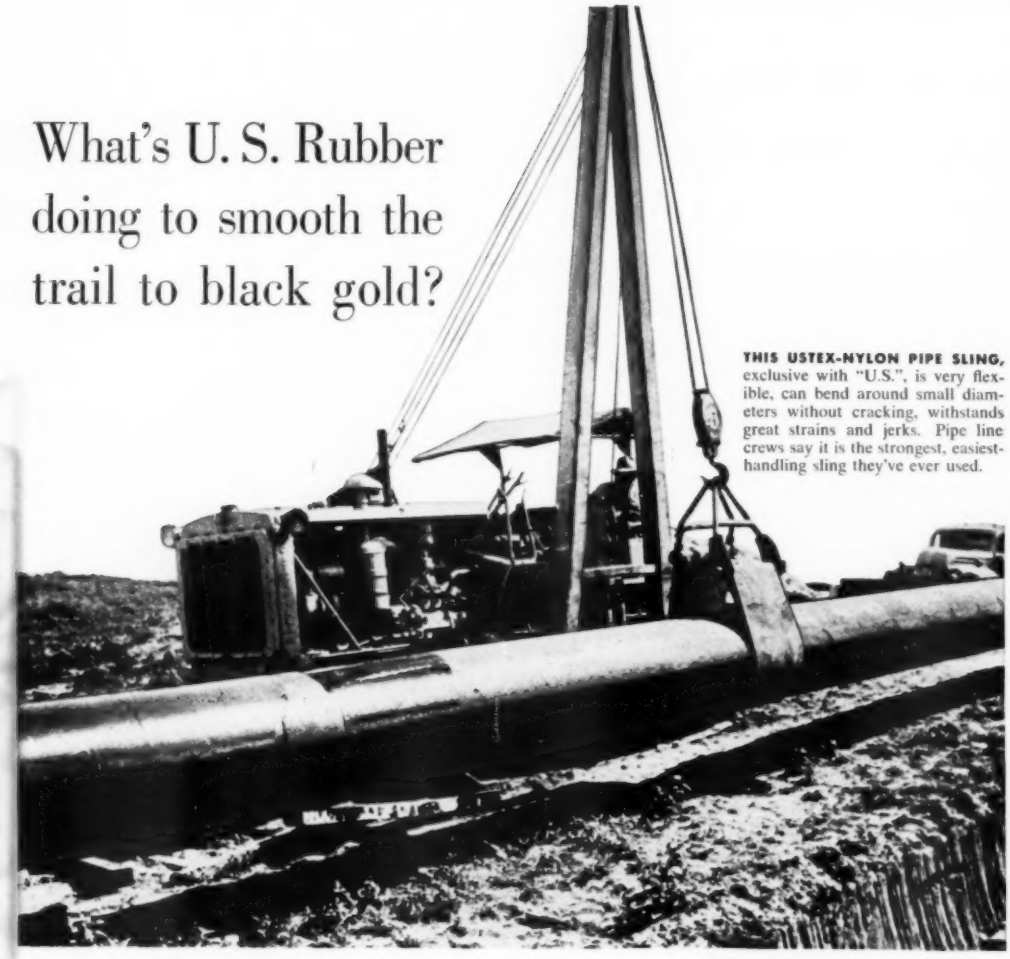
Houston and Beaumont, Texas

BEAUMONT

IRON WORKS COMPANY

Subsidiary, American Locomotive Company

What's U. S. Rubber doing to smooth the trail to black gold?



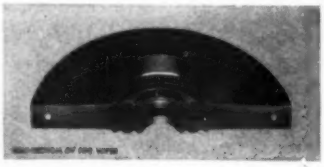
THIS USTEX-NYLON PIPE SLING, exclusive with "U.S.", is very flexible, can bend around small diameters without cracking, withstands great strains and jerks. Pipe line crews say it is the strongest, easiest-handling sling they've ever used.

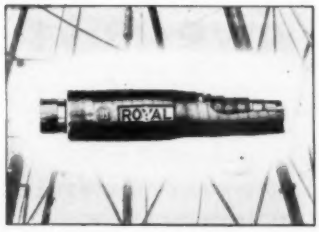
Shutdowns become more frequent and more serious, if reliable equipment, designed to handle these *new* problems, is not available. "U. S." experts are always ready with products that fill the new specifications required by today's progressive oil men.

You can cut costs, avoid delays by specifying U. S. Rubber Products for the oil field. "U. S." oil specialists and engineers are always ready to help you on specialized problems. Write to address below:

PRODUCTS OF
U.S.RUBBER
SERVING THROUGH SCIENCE

THIS NEW PIPE WIPER is reversible, molded in one piece with double wiping lips. Does the work of two old-style wipers, yet costs no more than the single type. Easily cut to pipe size. Individual wipers have handled over 315,000 feet (nearly 60 miles) of piping.





RUGGED U.S. ROYAL 4 ROTARY HOSE is so powerful that it need not be replaced by steel hose when high pump pressures are required. No excessive straining or kinking, because it is built for mousehole connections.

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

these are the famous

BG

UNSHIELDED, AND LOW-FIRE-HAZARD SPARK PLUGS

Offering Reliable Performance and Operating Economy for YOUR Spark Ignited Gas Engines . . .

Preferred by USERS of these and other great spark-ignited engines . . . .

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BG Spark Plugs have demonstrated their greater reliability in thousands of applications throughout the oil producing, pipeline and refinery fields. The BG method of shielding to ground reduces the serious hazard to life and equipment by eliminating Spark Plug flash-over.

Low-fire-hazard is only one of many advantages inherent in BG Spark Plugs. BG Spark Plugs assure maximum performance over a longer life and uninterrupted, trouble-free service. Their basic soundness, plus their reconditioning feature, combine to bring you the lowest cost in operation per spark plug hour.

GET THE FACTS

The BG Industrial Catalog illustrates and describes THE Spark Plug best suited to your needs. Get your copy and name of nearby distributor.

Write today

The B. G. Corporation
136 W. 52nd St., New York 19, N. Y.

Kindly send me name of your nearest distributor, together with information on Spark Plugs best suited to . . .

Engine make and type .....

Name .....

Address .....

City ..... Zone ..... State .....

THE B. G. CORPORATION, 136 West 52nd St., New York 19, N. Y.

Remember The Bayou Country

Did any of you Old Timers Pioneer Louisiana?

From Pine Island to Lake Ponchartrain, roustabouts kicked alligators off the thribble board, battled mosquitoes with a rig hatchet, and rode to work in a "swamp buggy." Remember? As the Cajun said, "Nom d'un chien!"

WILSON WAS THERE! WILSON WAS FIRST!

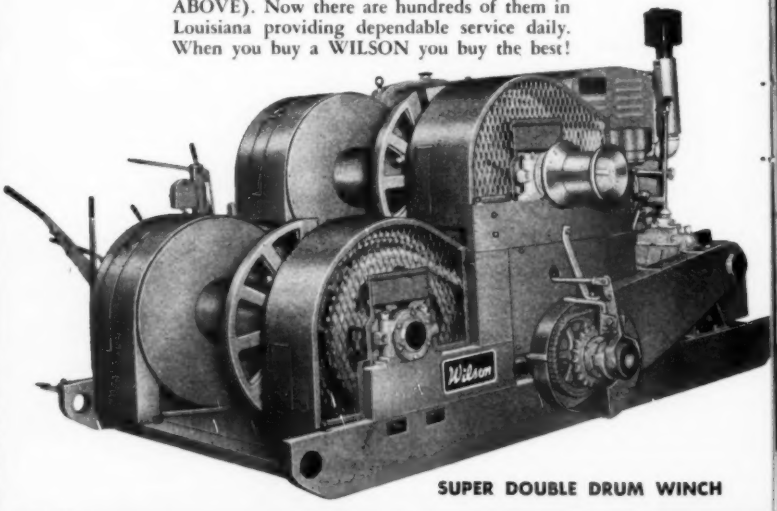
The first power winch in Louisiana was a WILSON (SIMILAR TO ONE PICTURED ABOVE). Now there are hundreds of them in Louisiana providing dependable service daily. When you buy a WILSON you buy the best!

Wilson

ADVANCED ENGINEERING GIVES YOU...

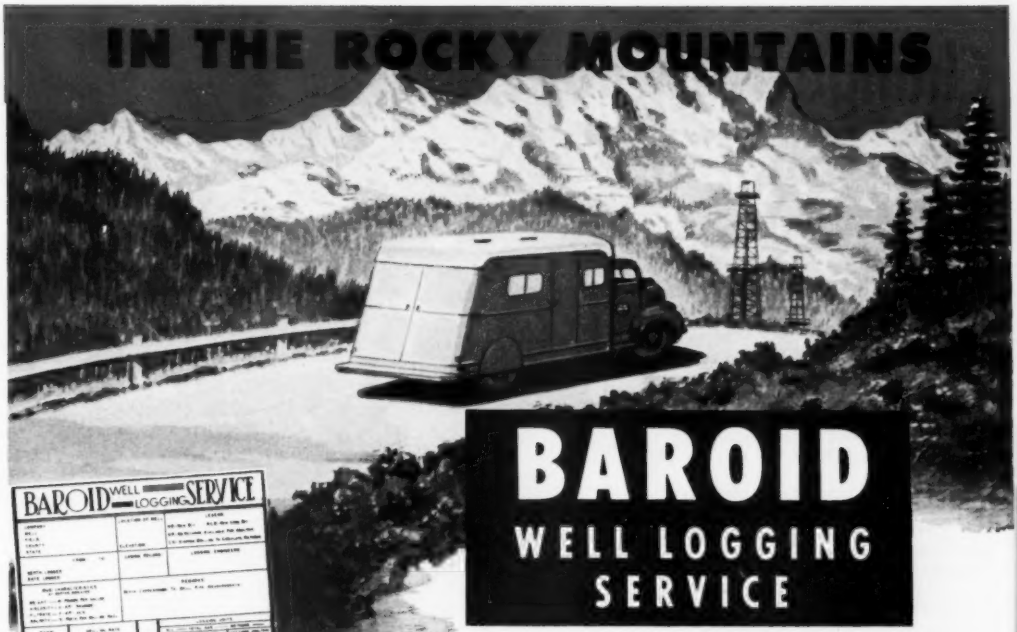
- better design
- lower cost performance
- longer life
- simpler and easier operation and maintenance

COMPARE QUALITY— COMPARE PRICES— BEFORE YOU BUY!

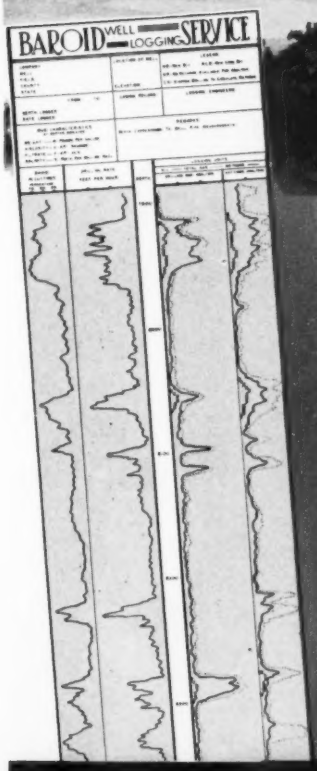


SUPER DOUBLE DRUM WINCH

Wilson MANUFACTURING CO., INC.
WICHITA FALLS, TEXAS



BAROID
WELL LOGGING SERVICE



answers all formation questions while the bit is going down

The fresh-water sands so common in Rocky Mountain oil areas make electrical logging difficult and doubtful. In these areas (and in many others) Baroid Well Logging Service is finding increasingly wide use because it provides operators with complete sub-surface information while the well is drilling. No need to "core the drilling breaks"— Baroid Well Logging detects every show of oil or gas, so cores need be taken only when analyses of the mud and cuttings returns indicate possible production. One successful well, for example, went to 10,000 feet, and tested every possible pay zone with just 6 cores! Porosity and permeability are also shown on Baroid Well Logs, together with lithology, the drilling rate, the depths and other pertinent information. Add all the advantages together and you will see for yourself that Baroid Well Logging Service gives you complete well data, with full assurance that no possible production has been missed, plus faster drilling time. And that means, of course, lower costs. We don't have to tell you the importance of that!

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Midland	596
Casper	1474W
Houston	CEntral 9371
Los Angeles	Michigan 1381
Tulsa	2-8161

Baroid

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The sooner you get these hard-working beads in your dehydrator, the sooner you'll get greater efficiency . . .

This new Sovabead team is ready now to give you all the benefits of a vastly improved desiccant for natural gas dehydrators.

Why wait until your present drying agent is completely inactive before you change?

Here's what you can get immediately:

S/V Sovabead increases the capacity of your units (almost double). It maintains this capacity at high temperatures (as high as 120° F.) with low effluent dew point.

S/V Sovabead dries sour gas, with a longer bed life. It eliminates caking and reduces channeling, dusting and pressure drops in the bed.

Reactivation is quick, easy, and economical.

Get the facts today from your Socony-Vacuum Representative.

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MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

Socony-Vacuum Process Products

Process Products
SOCONY-VACUUM

Stamina

for the steady grind

—and steady it is these days. Now as never before, working parts in drilling equipment *need* the strength and stamina of alloy steel.

Uniform response to heat treatment enables alloy steels to combine a high degree of core toughness and hard, wear-resisting surface. Thus, parts made of Republic Alloy Steels resist abrasion and wear. They withstand the stresses and strains of deep drilling. They *stand up* under severe service.

Why not let Republic's 3-Dimension Metallurgical Service help you insure against loss of time and revenue because of drilling break-downs. These field, mill and laboratory metallurgists will see that the *right* alloy steel analyses are applied to your specific needs.

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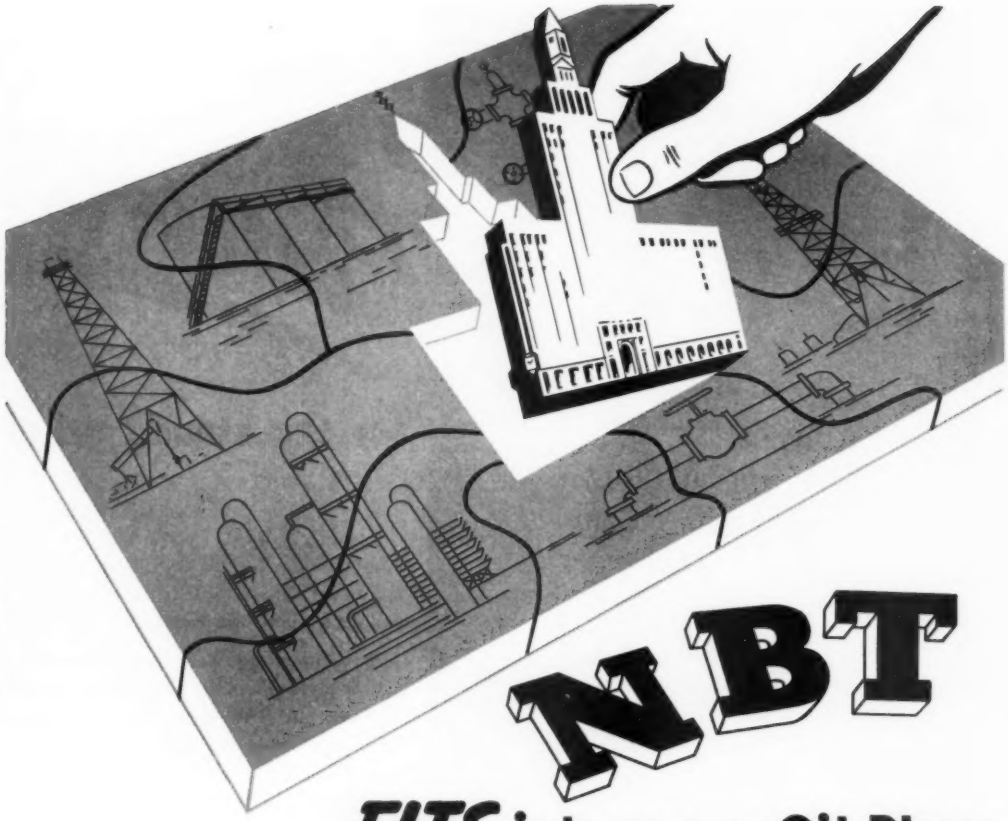
Alloy Steel Division · Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic ALLOY STEELS

REPUBLIC STEEL

Other Republic Products include Casing—Tubing—Line Pipe—Upson Studs, Bolts, Nuts and Rivets—Electrunite Boiler Tubes



FITS into your Oil Plans

Make National Bank of Tulsa financing a part of your oil program. NBT has the facilities, resources and experience to assure you the vital assistance and fast service you need when engaged in sound oil operations. A confidential, beneficial discussion of your needs will be welcomed by one of our officers any time.

The Oil Bank of America

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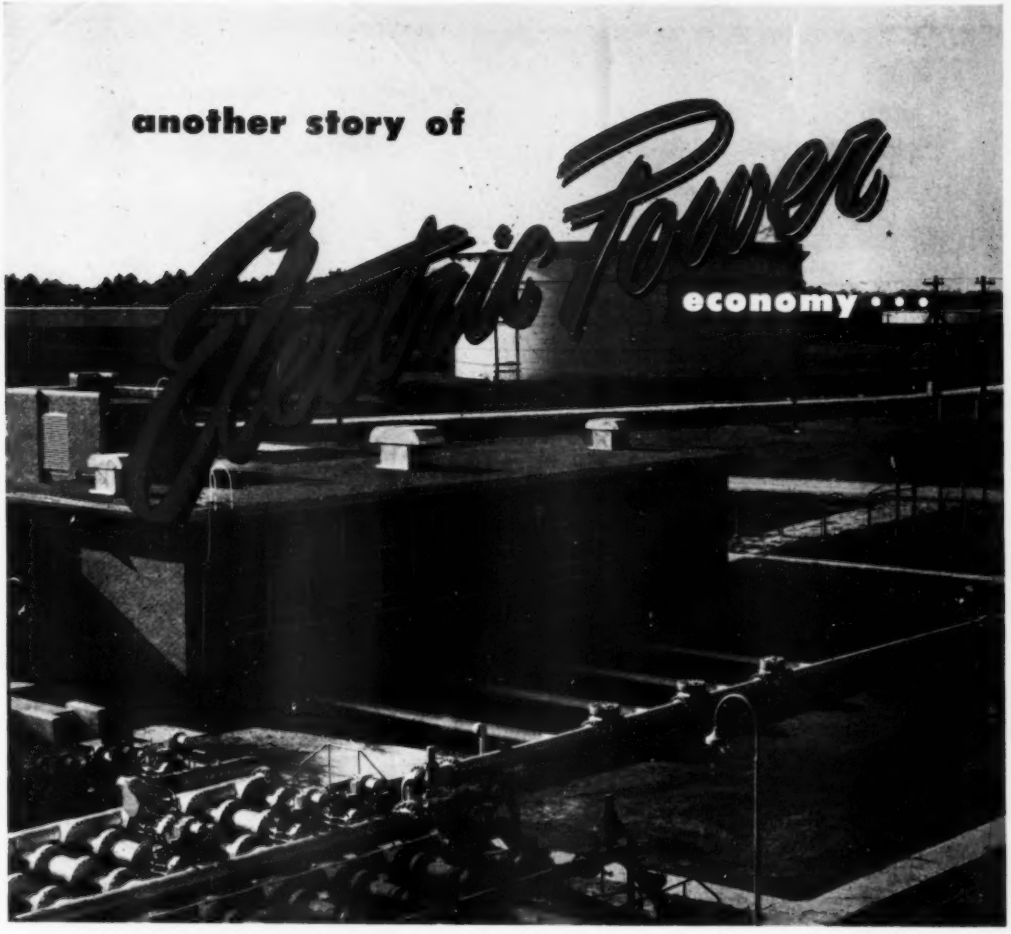

This pumping station south of Houston, Texas, operated by a major pipe line company is utilizing ELECTRIC POWER to its advantage. The terminal has three 600 H.P. motors, 44 electric booster pumps, 46 electric valves and 44 electric sump pumps. This is one of many such stations operated efficiently and at low cost by ELECTRIC POWER. Call the Power Engineer of your nearest Electric Power Company for facts of how ELECTRIC POWER can result in lower power costs for you.

Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS
OR ADDRESS YOUR REQUEST TO P. O. BOX 131, DALLAS, TEXAS

"You say I'll get more information with

LANE WELLS

Radioactivity

WELL LOGGING"

OK - tell me why!

All right — here's why. There are four good reasons. First, there's *curve quality*. That means curves which faithfully record every formation change of any significance. Lane-Wells assures you these accurate, dependable curves through *advanced equipment* — instruments sensitive to every significant down-hole variation, instruments carefully calibrated to produce highly repeatable responses. Then, you have *accurate depth measurements*. You know the importance of those, and you know, too, that Lane-Wells measurement accuracy is tops in the field. And finally, you know the vital importance of *operating experience*. Lane-Wells has run more than 36,000 radioactivity well logs; Lane-Wells men know the problems of practically every active oil field. That experience can be a great help to you on your job, particularly in the matter of interpretation where local conditions produce unusual responses.

Add them all together — equipment, accuracy and experience — and what do you have? Better results with Lane-Wells Radioactivity Well Logging.

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handles *Boiling HCl* for 2½ years!

This HASTELLOY Alloy Condenser is still on the job in 1-10% Acid Solution

The 28 in. tubes in this condenser for the distillation of hydrochloric acid are made from ½-in. diameter, 16-gage welded tubing of HASTELLOY alloy B. The end disks, which are ⅜ in. thick by 7 in. in diameter, are also of the nickel-base alloy.

This condenser, made of HASTELLOY alloy B, shows no signs of corrosion after two and one-half years in a vacuum still for the distillation of hydrochloric acid. Since it was installed, the unit has been in operation two to three days a week, eight hours a day, handling a dilute solution of the corrosive acid at temperatures up to the boiling point.

HASTELLOY alloy B is one of the few commercially available materials that can handle boiling hydrochloric acid—one of the most severely corrosive agents known to the chemical industry. Alloy B is available in all standard wrought forms and can be fabricated by most common methods. Two additional HASTELLOY alloys, designated as C and D, are also available for handling other highly corrosive chemicals, such as sulphuric acid and certain strong oxidizing agents, like ferric chloride and wet chlorine.

For complete information, write for the 40-page booklet, "HASTELLOY High-Strength, Nickel-Base, Corrosion-Resistant Alloys." It contains data on the properties, available forms, and fabricating techniques for all three grades of HASTELLOY alloy.

HAYNES TRADE-MARK *Alloys*

"Hastelloy" and "Haynes" are trade-marks of Union Carbide and Carbon Corporation.

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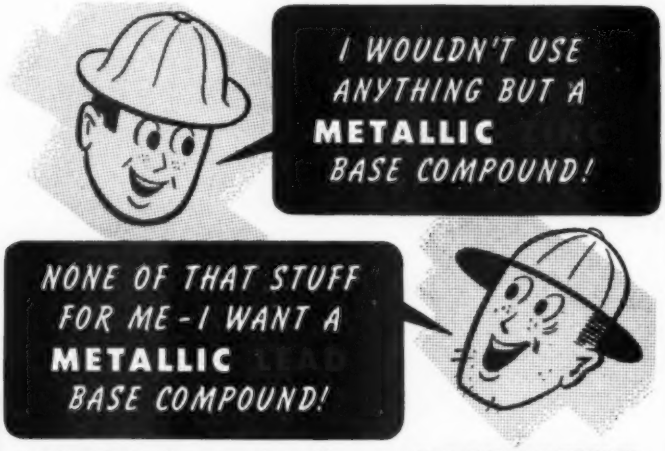

WECO has the best COMPOUND FOR BOTH OF YOU!

If you prefer a zinc base compound, you'll want NO-GALL, containing more than 50% PURE METALLIC ZINC, which exceeds tool joint manufacturers' specifications for this type of compound. It will give you maximum performance from your tool joints . . . will protect them against galling, freezing and thread friction. NO-GALL has no harmful fillers of any kind . . . will not squeeze out . . . will not harden . . . requires no thinner.

WECO STEEL-AID is what you need when you want a metallic lead base compound. It contains 67% PURE METALLIC LEAD . . . an even higher percentage than specified by tool joint manufacturers. Steel-Aid has no fillers or other harmful ingredients, is non-hardening, requires no thinner . . . will not squeeze out under extremely high torque or pressure . . . assures expected performance efficiency from tool joints.

Everybody agrees on this about
HI-SPEED SEAL

It's your best thread seal for casing, tubing, steam lines, oil and gas lines and others where leak-proof connections are essential. It seals with less torque . . . assures better make-up and faster break-out. Ask for WECO HI-SPEED SEAL . . . it requires no thinner.

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Manufacturers and Distributors of Oilfield, Refining, Marine and Industrial Equipment

They Say—

CMP Defined

"CMP is nothing but a good set of books. It keeps an accurate account of the steel, copper and aluminum that go into defense and defense-supporting programs. For the first time, then, we'll know after we get your applications exactly how much material is going into the defense program. We should then know exactly how much is left over for civilian goods . . .

"Let's bear one thing in mind—CMP is a procedure, not a program. In other words, CMP is a method, but CMP in itself doesn't make decisions. Many decisions regarding essentiality, regarding how much of this we want, or how much of that we must have, must still be made by men, just as they have been before."

John F. Skillman, production-controls staff, National Production Authority, addressing Cleveland Engineering Society.

Save Your Scrap

"A 10 per cent cut in steel production is imminent. At the National Petroleum Council meeting in Washington on May 9 we learned that some mills are operating today with only 7 days' supply of scrap on hand. A normal stock is at least 60 days' supply.

"But—we can do something about it. The answer is scrap. Our job is to gather up every bit of scrap iron on our premises and get it to the scrap dealer at once.

"Long-range plans are being formed. But unless the immediate need is met by getting the scrap in the hands of dealers now, there will be a curtailment in steel production within 30 days.

"Issue orders to your field men today."

R. L. Foree, president, in a letter to members of Texas Independent Producers and Royalty Owners Association.

Word of Warning

"There may and probably will be some local dislocations caused primarily by shortages of transportation or interruptions resulting from winter storms. This will be aggravated, of course, if we have an unusually severe winter.

"Because not enough sheet steel is available to build needed primary storage in areas where it is required, the marketing and distributing segments of the industry should make every effort to fill secondary storage,

IT TAKES *TEAMWORK!*

..to land a marlin...and to assure *efficient* slush pump operation

Mission Silver Top Valve for Normal Pressures

A 400-pound marlin is tough to handle . . . but expert teamwork will do it! Teamwork of precision parts is also what it takes to assure **efficient** slush pump operation. Piston, rod, liner, and packing must be in perfect alignment . . . must be a perfectly matched, precision team! Valves must be **equally** efficient and reliable.

The MISSION "Super Service" Liner rounded out the famous MISSION team of expendable slush pump parts. It is accurately bored, **induction** hardened to **uniform** case thickness, precision honed, and "Satin Finished". These MISSION parts constitute a perfectly mated **team, unbeatable** for reliability, efficiency, economy. Your supply store handles them . . . Mission Manufacturing Co., Houston, Texas. Export: 30 Rockefeller Plaza, New York. European Address: London, England.

Mission Super-Service Valve for High Pressures

"ROLLING DOG" SLIPS
TUBING SWABS
PLUG VALVES
CENTRIFUGAL PUMPS

Silver Anniversary MISSION MANUFACTURING CO. 1951

MISSION MANUFACTURING CO.

KEEP CEMENT OUT OF THE PAY ZONE with Cementrol

Running-in position

Packer set

IT PAYS to protect the pay zone from cement contamination when your casing is to be set above an exposed producing formation.

CEMENTROL provides this protection by means of the most effective, time-tested means ever devised in the oil fields —a rubber pack-off.

CEMENTROL is a hydraulically actuated tool, simple and efficient in its operation and effective in its application.

THOUSANDS OF WELLS ARE BETTER PRODUCERS BECAUSE OF CEMENTROL PROTECTION.

CEMENTROL is available "Through Your Supply Store" and your nearby Larkin representative will gladly give you any necessary assistance, including field service.

LARKIN

...Through Your Supply Store

LARKIN PACKER CO., INC.

ST. LOUIS, MO.

which includes both bulk plants and consumer storage, well in advance of the next heating season. If this is done, it not only will make consumers' positions safer, but it will permit the industry to accumulate sufficient stocks to handle normal demands."

H. A. Stewart, Petroleum Administration for Defense, addressing Tennessee Oil Men's Association, Chattanooga.

Pity the Contractor

"The drilling contractor takes over, furnishes all of the variables and binds himself to drill a hole to an ungodly depth for a price per foot that completely ignores the risk factor and oftentimes the profit factor as well. However, this is neither the time nor the place to further pursue this subject. If I should really get under way and tell the whole sordid story of the drilling contractor's troubles, there wouldn't be a dry eye in the house."

Frank M. Porter, president, American Petroleum Institute, addressing New York chapter of Nomads.

Example for Government

"If we in the oil business are doing wrong by the public we certainly should be stopped.

"But, if we're doing what's right and necessary and beneficial for the public, then the public had better see to it that we're not thrown out of gear or utterly out of commission...

"Instead of trying to knock the integration out of business, it seems to me the Government could stand to borrow a little of it from us, to put the left and right hands into harmony, and build up a working relationship between industrial policy and the national interest."

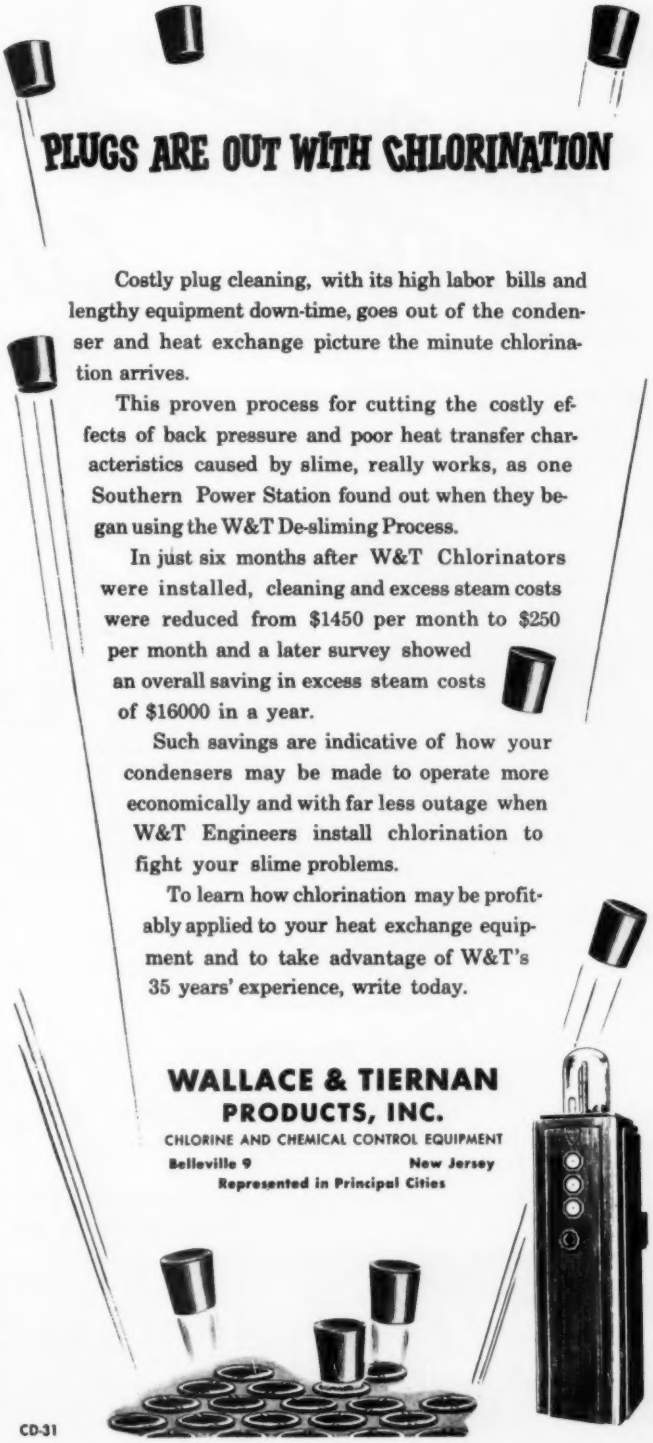
T. S. Petersen, Standard Oil Co. of California, addressing Portland, Ore., Chamber of Commerce.

East Coast Shortage?

"Supply conditions on the Eastern Seaboard of residual and light heating oils are not too encouraging; stocks are below normal levels and buildups, which customarily occurred at this time of year, are not coming up to adequate levels. Unless some unforeseen circumstances occur, you gentlemen may find you have quite a task confronting you during this coming winter.

"I understand you are cooperating with primary suppliers to utilize secondary and customer storage to the fullest extent possible: To the degree such a program is successful, the possible winter fuel problem will be minimized. Such a program would appear to be worthy of top priority in your immediate plans."

O. D. Judd, chief of the petroleum branch of OPS, addressing Empire State Petroleum Association, Buffalo.


PLUGS ARE OUT WITH CHLORINATION
Costly plug cleaning, with its high labor bills and lengthy equipment down-time, goes out of the condenser and heat exchange picture the minute chlorination arrives.
This proven process for cutting the costly effects of back pressure and poor heat transfer characteristics caused by slime, really works, as one Southern Power Station found out when they began using the W&T De-sliming Process.
In just six months after W&T Chlorinators were installed, cleaning and excess steam costs were reduced from $1450 per month to $250 per month and a later survey showed an overall saving in excess steam costs of $16000 in a year.
Such savings are indicative of how your condensers may be made to operate more economically and with far less outage when W&T Engineers install chlorination to fight your slime problems.
To learn how chlorination may be profitably applied to your heat exchange equipment and to take advantage of W&T's 35 years' experience, write today.
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CHLORINE AND CHEMICAL CONTROL EQUIPMENT
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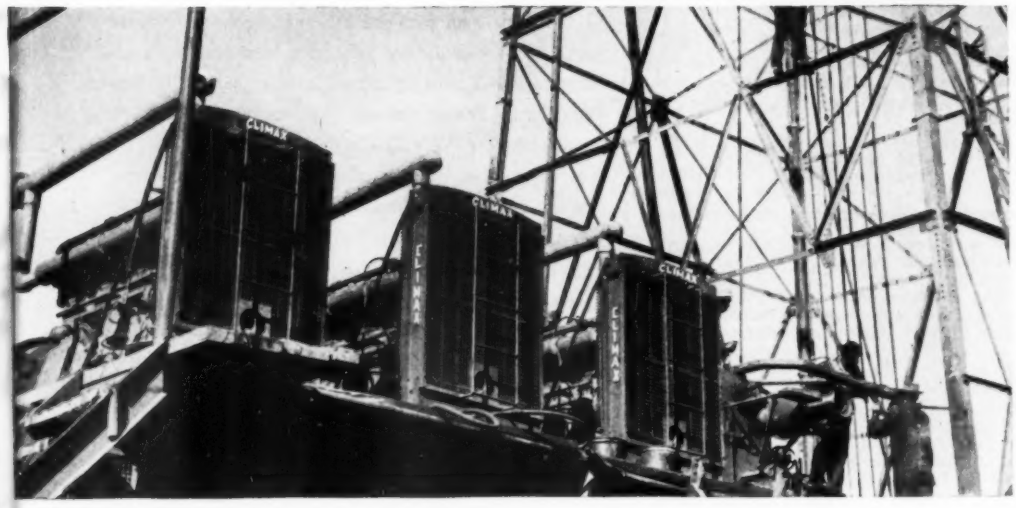
DRILL DEEPER... FASTER... CHEAPER with climax

BLUE STREAK ENGINES



STURDY, rugged, compact V-8's and V-12's have extra power for load peaks — STAYING POWER that speeds up and cuts the cost of deep drilling.

Climax Blue Streak Engines operate on natural gas, butane or gasoline, with unmatched economy and efficiency. They are instant starting, fast accelerating, smooth running, flexible, dependable prime movers, with Hi-power combustion.

Investigate Climax Performance before you invest in any engine

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CALENDAR

June

National Oil Scouts and Landmen's Association, annual convention, Hotel Beaumont, Beaumont, Tex., June 7-9.

Rocky Mountain Oil and Gas Association, midyear meeting, Henning Hotel, Casper, Wyo., June 8-9.

Liquefied Petroleum Gas Association, Inc., first annual Mountain States district convention and trade show, Troutdale-in-the-Pines, Evergreen, Colo., June 10-12.

American Society of Mechanical Engineers, semiannual meeting, Toronto, Ont., Canada, June 11-15.

Pennsylvania Grade Crude Oil Association, 1951 annual meeting, Hotel William Penn, Pittsburgh, June 14-15.

Petroleum Equipment Suppliers Association, annual meeting, Chateau Frontenac, Quebec, Canada, June 17-20.

Canadian Gas Association, Bigwin Inn, Lake of Bays, Ont., Canada, June 18-21.

American Society for Testing Materials, annual meeting, Atlantic City, N. J., June 18-22.

Kentucky Oil and Gas Association, annual meeting, Ventura and Henry Clay hotels, Ashland, Ky., June 21-22.

American Institute of Electrical Engineers, summer general meeting, Royal York Hotel, Toronto, June 25-29.

July

Western Petroleum Refiners Association, regional meeting, Broadview Hotel, Wichita, July 19-20.

Wyoming Geological Association, sixth annual field conference, Rawlins, Wyo., July 31-August 3.

August

Society of Automotive Engineers, Inc., West Coast meeting, Olympic Hotel, Seattle, August 13-15.

Western Petroleum Refiners Association, regional meeting, Leonard Refineries Auditorium, Alma, Mich., August 17.

American Institute of Electrical Engineers, Pacific general meeting, Multnomah Hotel, Portland, Ore., August 20-23.

Eleventh Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va., August 27-29.

September

American Chemical Society, 120th national Diamond Jubilee meeting, Hotel Statler, New York City, September 3-7.

Pacific Coast Gas Association, annual convention, Fairmont Hotel, San Francisco, September 4-6.

Michigan Petroleum Association, annual fall convention, Ramona Park Hotel, Harbor Springs, Mich., September 6-7.

International Union of Pure and Applied Chemistry, sixteenth conference, Hotel Statler, New York City, September 8-9.

New York Oil Heating Association, Inc., Hotel Statler, New York City, September 10.

International Congress of Pure and Applied Chemistry, twelfth conference, Hotel Statler, New York City, September 10-13.

Instrument Society of America, Coliseum, Houston, September 10-14.

American Society of Mechanical Engineers, Industrial Instrument and Regulators division, Coliseum, Houston, September 10-14.

National Petroleum Association, Hotel Traymore, Atlantic City, September 12-14.

International Union of Pure and Applied Chemistry, sixteenth conference, Hotel Statler, Washington, D. C., September 14-15.

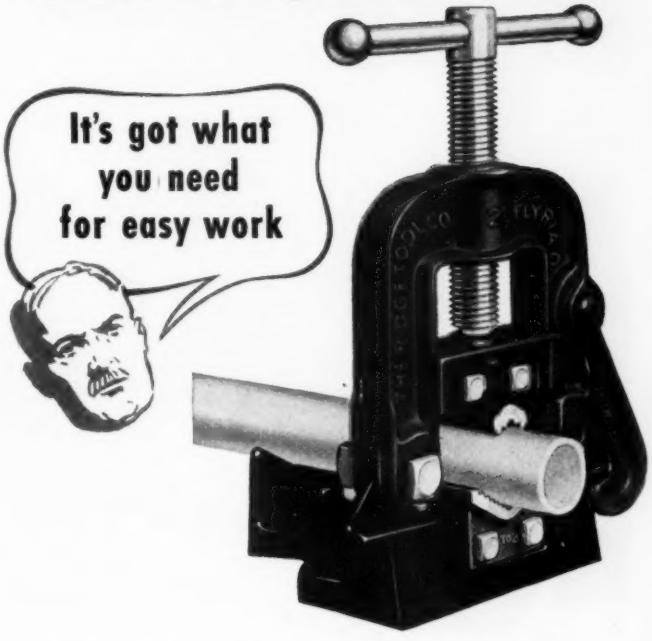
American Institute of Chemical Engineers, national meeting, Sheraton Hotel, Rochester, N. Y., September 17-19.

Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo., September 20-21.

American Association of Oilwell Drilling Contractors, eleventh annual meeting, Texas Hotel, Fort Worth, September 21-23.

American Society of Mechanical Engi-

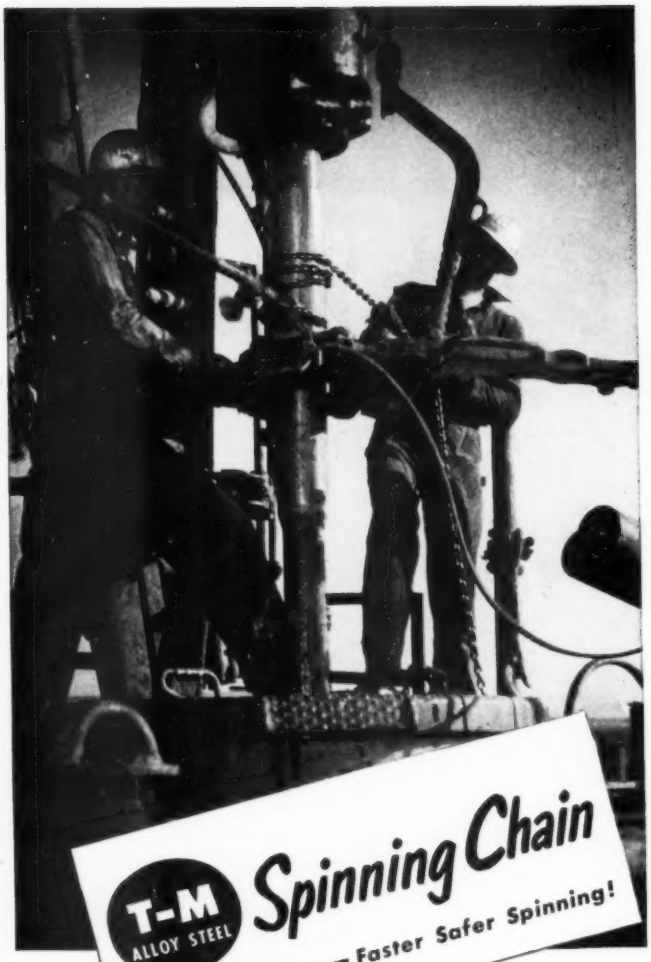
The Handy Durable RIDGID Bench Yoke Vise



● You save time and effort with this more-for-your-money RIDGID Bench Vise. Right where you need 'em are its intregral pipe rest and benders that won't flatten pipe—and heat-treated tool-steel LonGrip jaws mean you don't have to be so fussy with polished pipe. Special malleable frame, extra durable. 8 sizes to 6″ pipe, bench, post, stand and Tristand models, yoke and chain. Order from your Supply House.

RIDGID

★ Work-Saver Pipe Tools ★



TM Alloy Steel Spinning Chain is *tougher* and harder than conventional Hi-Test types. Its greater resistance to wear—plus its greater strength and longer life means lower spinning chain costs. Short links assure better grips. Complete heat-treatment—in modern furnaces—means uniformity in every link. Also available in TM Hi-Test grade. See your nearest oil well supply store for details on these and other TM Chains for hold-downs, snake-ins, rigging and the complete line of TM Tire Chains.

S. G. TAYLOR CHAIN CO., HAMMOND, INDIANA

TAYLOR MADE
A GREAT NAME IN
Chain SINCE 1873

neers, sixth petroleum mechanical-engineering conference, Mayo Hotel, Tulsa, September 24-26.

American Society of Mechanical Engineers, fall meeting, Radisson Hotel, Minneapolis, September 25-28.

October

American Institute of Mining and Metallurgical Engineers, petroleum branch, fall meeting, Oklahoma City, October 3-5.

California Natural Gasoline Association, twenty-sixth annual fall meeting, Ambassador Hotel, Los Angeles, October 4-5.

Texas Mid-Continent Oil and Gas Association, annual meeting, Hotel Beaumont, Beaumont, Tex., October 8-9.

American Oil Chemists' Society, fall meeting, Edgewater Beach Hotel, Chicago, October 8-10.

National Safety Council, thirty-ninth national safety congress and exposition, Stevens Hotel, Chicago, October 8-12.

Indiana Independent Petroleum Association, fall convention, Hotel Severin, Indianapolis, October 13-14.

Oil Progress Week, October 14-20.

American Petroleum Credit Association, twenty-seventh annual conference, Adolphus Hotel, Dallas, October 15-17.

American Gas Association, annual convention, Kiel Auditorium, St. Louis, October 15-17.

National Metal Congress and Exposition, American Society for Metals, American Welding Society, American Institute of Mining and Metallurgical Engineers, and Society for Non-Destructive Testing, Hotels Statler, Book-Cadillac, and Detroit-Leland, Detroit, October 15-19.

Institute of Gas Technology, annual meeting, Chicago, October 18.

National Association of Corrosion Engineers, South Central Region, annual meeting, Corpus Christi, Tex., October 18-20.

Independent Petroleum Association of America, Shamrock Hotel, Houston, October 21-23.

American Institute of Electrical Engineers, fall general meeting, Hotel Cleveland, Cleveland, October 22-26.

Society of Automotive Engineers, diesel-engine division, Drake Hotel, Chicago, October 29-30.

Society of Automotive Engineers, fuels and lubricants division, Drake Hotel, Chicago, October 31-November 1.

November

American Petroleum Institute, thirty-first annual meeting, Stevens Hotel and Palmer House, Chicago, November 5-8.

Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver, November 15-17.

American Society of Mechanical Engineers, annual meeting, Chalfonte-Haddon Hall, Atlantic City, November 25-30.

Twenty-third Exposition of Chemical Industries, Grand Central Palace, New York City, November 26-December 1.

December

American Institute of Chemical Engineers, annual meeting, Chalfonte-Haddon Hall, Atlantic City, December 2-5.

New York Oil Heating Association, Inc., Hotel Statler, New York City, December 10.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

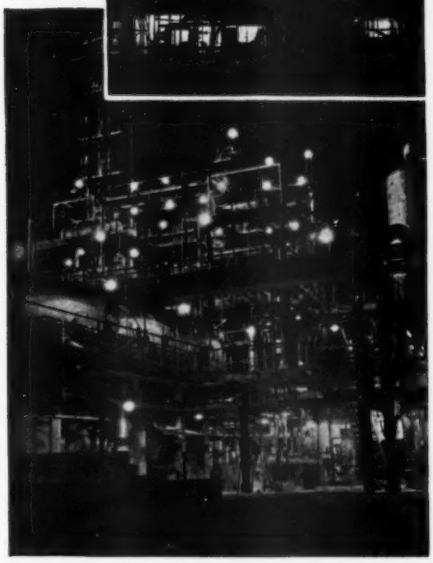
Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads, first Monday of each month, Louis Sherry's, 300 Park Ave.

Non-Stop Operations

Illuminating the desert for miles around are the bright lights of Anglo-Iranian's major Middle East refinery at Abadan, largest in the world. Anglo-Iranian has refineries in eight other countries, including three in the United Kingdom, four on the continent of Europe and one in Australia. A large new refinery in England is also under construction.



Operating night and day, the processing by Anglo-Iranian of crude oil into quality products for the world's markets goes on unceasingly. Here is the night shift's view of an Alkylation Plant and (inset above) a Distillation Unit.

First and Biggest

oil producers in the Middle East since 1912, Anglo-Iranian Oil Company and its associated companies also operate twelve refineries in Europe, Middle East and Australia; their sales organisation includes major marketing or supply interests in Europe, Asia, Africa and Australasia, with international ships' bunkering and aviation services.

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JOURNALLY Speaking

Field Notes

A NEW man around here accompanied one of our staff on a field trip to several water-flooding projects in northeastern Oklahoma, mainly for the ride and to drive the car. Being a helpful sort of fellow, and since it was on working hours, he volunteered to take notes, too, which he obligingly turned in on his return, as follows:

"Party assembled in Bartlesville park. Estimate 100 cars. Didn't know so many people interested in water flooding. Must be something to it. Delay getting under way. Time to examine (behind steel fence) first oil well in Oklahoma—it says on stone marker. Wonder why they picked location in park. Probably as good as any. Maybe to get water from river 10 ft. away for boiler; steam rig. Cable tools; can tell because cable still there. Tools on derrick floor look to be still in good condition. Rest of equipment, if any, hidden in wooden shed. Derrick and shed could stand some paint. So that's what started the oil business in Oklahoma.

"Loud-speaker car says get going. Would have car facing wrong direction. Have to wait for tail end of parade to turn around. What dust. Hope car in front is one of party. Might end up in some farmer's yard. Traffic jam ½ mile ahead. Turn car around to be first out. Park and walk through mud. Company ought to provide boots. Must get shoeshine on expense account some way.

"Elbow way into pump house. Man pointing and talking but too much noise to hear, so just look wise. Nothing much here except engines, pumps, and meters. Visitors lift up lids of meters and read the numbers. Don't see why they're so curious. How'd they like to have strangers read their meters? Outside man giving lecture from sound truck. Hard to hear on account of pump engines, but think most of what he said already in mimeographed dope I left in car.

"Back to cars for next jaunt. Wrong again. Party continues in same direction, so still at tail of parade. Second project looks much like first except pumps go up and down instead of sideways. Make note; might be very significant. Man at mike says field ready to be abandoned 2 years ago. Spent over $300,000 in water flood. Already got money back twice and expect to make a million. Says he favors water flooding. Natch.

"Third project looks much like other two except pumps go round and round. Must be whirling-spray type of water flood.

"While visitors read meters, notice heating stove in corner. Burns coal. What d'you know? Looks like treason. Better not mention in oil publication. Awful thirsty. All this talk about millions gal. water but can't find a drink. Car stuck in sand. Wonder if it's that Bartlesville sand they were telling about. Projects 4 and 5 look about like others from road. Too tired to hike over. Dope probably all in mimeographed sheets anyway. Feel now expert on water flooding. Suggest next field assignment be offshore drilling. Prefer water where it can be seen instead of all in pipes and underground."

Oil School

A $260,000 school building for only 65 grade-school children may sound like extravagance, but the oil men who pay all the taxes in McKittrick, Calif., don't look on it that way. The town, in the desert part of Kern County, has more oil wells than people and more kids than trees, but when it comes to education the best is none too good for it. The completely air-conditioned building contains an auditorium, cafeteria, lounge, and all the most approved arrangements and devices for making kids like school. The plant also doubles as the community center, and when the temperature hits 115° the parents go to school, too, for meetings, dances, banquets, and movies. McKittrick can get and keep good teachers now, because the town built air-conditioned homes for them.

This doesn't sound like the company towns of the old oil-boom days, and it isn't. Petroleum is progressive, and nowadays oil takes care of its own. Good education has been a big help to the oil industry and vice versa, in McKittrick and a lot of other places all over the world.

—Henry D. Ralph.

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June 7, 1951

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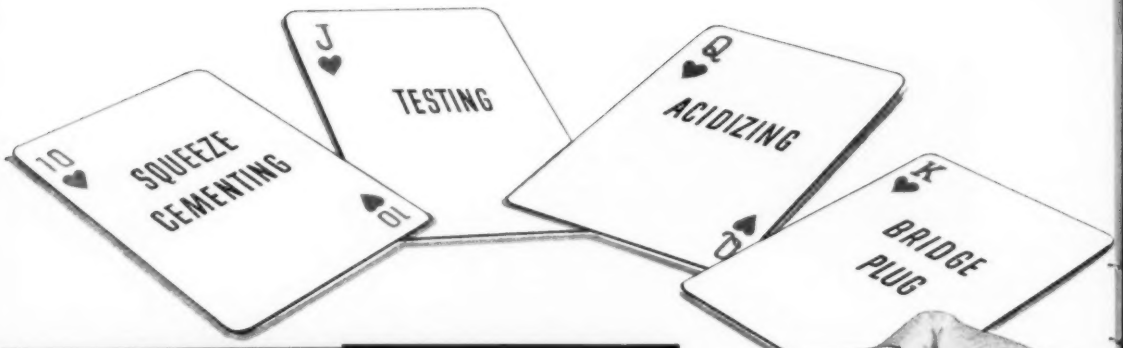

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Michigan's Shenanigans

A prize example of the political shenanigans which frequently face the oil industry occurred in Michigan last week.

The legislature increased the state gasoline tax by 1½ cents per gallon. Then Gov. G. Mennen ("Soapy") Williams called a conference of oil companies to propose that they reduce the price of gasoline by an equal amount so that the good people of Michigan would not have to pay any more.

This is a fine idea for politicians—hide the tax from the voters, or get somebody else to absorb it. The trick has been tried many times before, but this is one of the most barefaced and naive attempts on record.

Of course it didn't work. The companies politely informed the governor that both federal and state antitrust laws prohibit them from meeting to discuss or agree on prices—even a reduction in prices—and that major companies have been accused of keeping prices too low just as often as they have been accused of charging too much.

In addition to the legal aspect, the governor's request was patently silly on other grounds. In Michigan there are 15 refineries operated by independent companies—the "small business" every politician clasps to his breast at election time. If the major marketers should reduce prices by 1½ cents, these independents would find their profit margin squeezed to the vanishing point. And if the governor thinks that such a cut could or would be absorbed—painlessly and silently—by filling-station operators or crude producers, his knowledge of practical politics is even poorer than his understanding of simple economics.

Michigan has long been a gasoline-price battleground, and as the result of competition the prices there now are lower than in many nearby regions. There is no economic justification for a further lowering of the price before taxes. Furthermore, such an artificial reduction would send gasoline to other and more profitable markets, leaving Michigan with a shortage.

Finally, there is the matter of common sense and common justice, and this applies to all political chicanery designed to conceal taxes. The gasoline tax is imposed on consumers, ostensibly to pay for the roads they use. There is no reason in the world why the oil industry should pay it for the motorists. And if the politicians are ashamed of the heights to which they have pushed taxes, it is not up to industry to help hide their deeds.

There is no such thing as a painless tax. Every tax is paid by the sweat of somebody's brow, and is a drain on the income and productive effort of the community. The more that politicians succeed in hiding taxes, the more they will be encouraged to impose excessive and unwise taxes. Far from conniving at tax concealment, the oil industry should blazon the slogan: "Gasoline is cheap; only the tax is high."

THIS WEEK

PRICES—OPS authorizes increase in price of residual fuel oil along East Coast of 17 to 31 cents per barrel. . . . Agency says hike approved in recognition of anticipated shortages and because of increased tanker rates. . . . ¶I.P.A.A. leaders urge increase in price of crude oil to compensate in part for increased costs of finding and producing oil. . . .

INTERNATIONAL—Kuwait reports record production of 502,727 bbl. daily in April, compared with 375,380 bbl. daily in March. . . . Increased output reflects slowdown in Iran, where production dropped an estimated 200,000 bbl. per day. . . . ¶Observers optimistic over Iranian situation as Britain agrees to send representatives for discussions. Iran postpones plans for immediate nationalization of properties. . . . ¶Continued increase in Venezuela's drilling activity expected. . . . Ten per cent more rigs now operating than in 1950. . . .

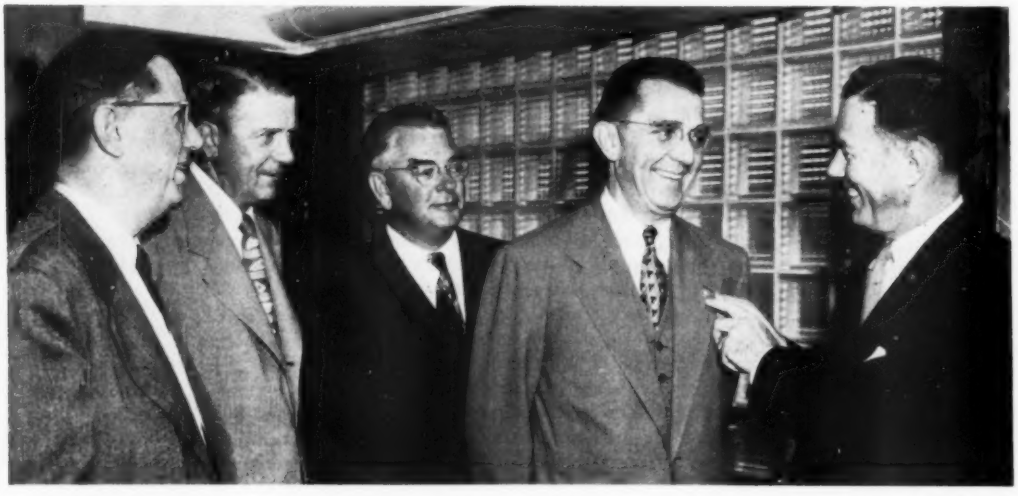
GOVERNMENT—House committee expected to vote quick approval of bill quitclaiming tidelands to states. . . . Hearing scheduled after House tires of Senate stall on legislation. . . . ¶PAD produces complete rewrite of M-46 order, now offers priorities assistance for U. S., Canadian operators in all branches of petroleum industry. . . . ¶PAD allocates 15,000 tons of steel for construction of tankage at ice-bound ports in eight states. . . .

ACTIVITY—Crude production for week ended June 2 averaged 6,103,725 bbl. daily, up 11,400 bbl. daily. . . . ¶Total completions dropped 82 wells to 742 for the week. . . . ¶Wildcat completions totaled 174 wells compared with 201 for previous week and 161 for same week last year. . . . ¶Rotary rigs operating in United States on May 28 decreased 48 rigs from the all-time high of the previous week for a total of 2,443. . . .

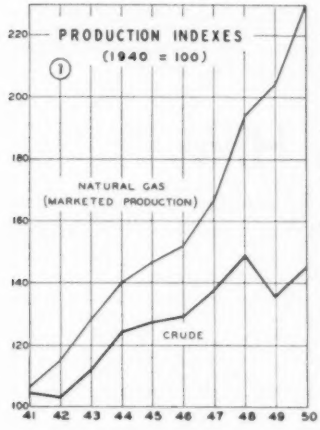
TRENDS—Primary stocks of distillate fuels, located at refineries and terminals east of California, were 13,148,000 bbl. greater on May 26 than on same date last year. . . . East Coast accounted for 5,807,000 bbl. of the increase. . . . Largest relative gain was in Mid-Continent and North Central areas, up 76.6 per cent. . . .

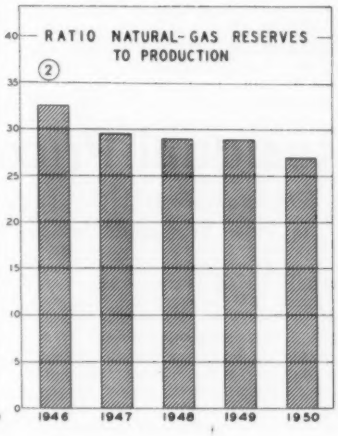
INDUSTRY—Amerada finds two new producing horizons in North Dakota discovery well. . . . ¶Texaco Exploration and McColl-Frontenac bring in first Alberta crude discovery after 11-year search involving expenditures of $10,000,000. . . . ¶Shell goes below 16,276 ft. in Weeks Island field to set new Louisiana depth record. . . . ¶Operators give tentative approval to plan for unitizing Canyon reef fields of Scurry County. . . . Engineers estimate unit operation could double ultimate production from huge reef reservoir.

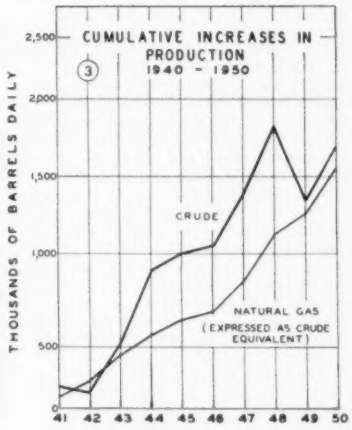
REFINING—Socony-Vacuum announces plans to build first commercial unit using Thermofor cat reforming process at Augusta, Kans., refinery. . . . Unit to have capacity of 3,000 bbl. per day. . . . Process provides continuous regeneration of new bead catalyst. . . . ¶Construction started at Sarnia on 25,000-bbl. fluid cat cracker by Imperial Oil, Ltd. . . . Refinery throughput capacity to be increased to 71,000 bbl. per day. . . .



JOURNAL GETS 50-YEAR PIN.—L. F. McCollum, president of Continental Oil Co., presents P. C. Lauinger, publisher of The Oil and Gas Journal, with a Continental 50-year diamond-studded gold pin in recognition of the fiftieth anniversary year of the publication. The presentation was made in Tulsa last week before a group of oil and business associates of Lauinger as the Golden Anniversary Number of the Journal was being mailed to subscribers. McCollum explained the awarding of the pin was recognition of 50 years' service to the oil industry on the part of The Oil and Gas Journal, which was headed for many years by Lauinger's grandfather, the late P. C. Boyle, followed by his father, the late Frank T. Lauinger. P. C. Lauinger has been publisher of the Journal since 1931. Others in the picture are, left to right, C. C. Herndon, executive vice president of Skelly Oil Co.; Louis W. Grant, president of Home Federal Savings & Loan Association; and W. K. Warren, president of Warren Petroleum Corp.







Gas: Industry Giant

Gas gains outstripping oil's progress in meeting nation's fuel needs; prospects are for bigger industry, more gains

John C. Casper

RAPID expansion of markets for natural gas during the next few years is a certain bet. The statistical position of gas in comparison with other fuels makes this a certainty.

The bulk of the gas seeking a market is in the Southwest, and much of it will find its markets in that region. But the Northeast still remains the biggest market of all, and this means that more huge, long-distance transmission lines are sure to be constructed.

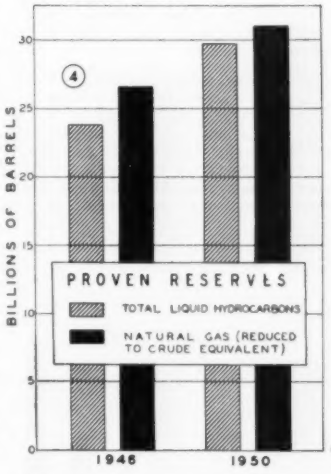
Natural gas has had a greater relative gain in the past 20 years than any other fuel.

In 1949 natural gas supplied 19.4 per cent of total energy requirements of this country, more than twice its contribution in 1930. The portion of total energy supplied by domestic crude in 1949 was 1.5 times that in 1930. Coal had a relative decrease for the period from 62.2 per cent of the total in 1930 to 39.3 per cent in 1949.

Total energy supply increased 24 per cent in the 1940-49 period. Compared with this gain, marketed production of natural gas increased 104 per cent.

Marketed production of natural gas in 1950 has been estimated at 6,124,000,000,000 cu. ft. by the Bureau of Mines, or 2.3 times the production in 1940. Crude-oil production in 1950 was slightly less than 1.5 times production at the earlier date.

Gas vs. oil.—In order to make comparisons between crude and natural gas, the data for the accompanying



charts have been converted to crude-oil equivalents on an energy basis, using a rounded conversion factor of 6,000 cu. ft. of gas per barrel of crude.

Natural gas produced and marketed in 1940 was equivalent to crude production of 1,215,000 bbl. daily and had increased to 2,797,000 bbl. daily by 1950, a gain of 1,582,000 bbl. daily for the 10-year period. Crude production increased 1,705,000 bbl. daily in the same years. This comparison shows that the remarkable increases in crude production have been only slightly larger than the actual gains in marketed production of natural gas. Cumulative gains on a year-to-year basis are shown in Chart 3.

Relative gains for the two fuels are indicated by the lines in Chart 1. With production in 1940 as 100, the crude index was up to 146 by 1950, compared with 230 for marketed production of natural gas.

Total energy represented by proven reserves of natural gas is greater than reserves of total liquid hydrocarbons (Chart 4). At the end of 1950, proven gas reserves were equivalent to almost 31,000,000,000 bbl. of crude. Proven reserves of total liquid hydrocarbons (crude plus natural gas liquids) amounted to slightly less than 30,000,000,000 bbl.

Gas reserves have been increasing, but the relative increase has been less than for production, resulting in a decline in the ratio of reserves to total net production for the year. Reserves at the end of 1946 amounted to 32.5 times total net production for the year. By 1950 the ratio had decreased to 26.9. Despite the drop, the ratio for gas is still high compared with less than 14 for total liquid hydrocarbons. Postwar ratios are shown in Chart 2.

Gas reserves in the Southwest account for almost 90 per cent of the country's total, but only 81 per cent of the gas marketed in 1949 was produced in this area. Since most of the recent and projected production increases are for the Southwest, the percentage of production will climb nearer the percentage of reserves. The area accounted for only 75 per cent of total production in 1946 with 89 per cent of proven reserves.

Reason for trend.—In general, the feasibility of marketing natural gas in any particular area will depend on the density of population in the area and the relationship between gas prices before distribution costs are added and prices of competing fuels.

The area north of Tennessee-North Carolina and east of the Mississippi River has 54.2 per cent of total population of the country but only 16.7 per cent of total area. The density of the population in this industrial area fulfills one of the requirements for natural-gas marketing.

Since this part of the country has only 2.6 per cent of our gas reserves, any increase in natural-gas sales in the area must be supplied by outside production. The big pipe-line construction programs of the postwar years resulted from supply-demand factors. The low well-head prices for natural gas in the Southwest and the reduction in transportation costs made it possible to deliver gas into the high-demand areas at prices competitive with other fuels.

The effect of this construction program is indicated by the gain in movement of natural gas into the northeastern part of the country as shown in Chart 5. This movement amounted to 188,000,000 cu. ft. a day in 1935 and had increased to only 846,000,000 cu. ft. daily by 1946. New lines and looping programs for older lines boosted shipments to 2,043,000,000 cu. ft. daily in 1949, the last year for which detailed statistics are available.

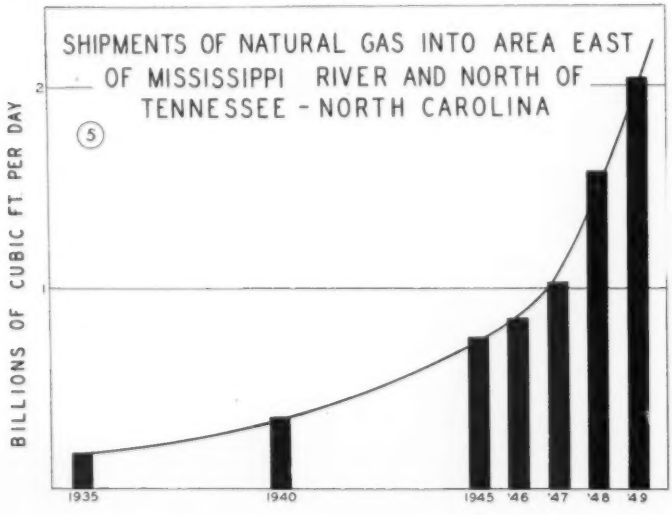
For areas nearer points of production in the Southwest, natural gas has an even greater price advantage and has become the principal power source for the entire area.

Average value of gas at the well for all southwestern states was 4.6 cents per thousand cubic feet in 1949. On a basis of energy content, this would be equivalent to crude at about 27.6 cents per barrel. This average value will improve since contracts covering supplies for the postwar lines have carried higher prices for pipe-line gas.

Growth assured.—This low-priced, quality fuel has been a factor in attracting industry to the Southwest. Also, the value as a raw material has helped make the Gulf Coast area the petrochemical center of the country.

Pipe-line construction authorized by the Federal Power Commission, and additional applications pending, indicate further increases in long-distance transmission pipe lines.

But whether growth is through increased industrial activity in the producing states, or as a result of more long-distance pipe lines, natural gas will have an even greater part in the program of supplying energy for our expanding economy.



Residual Price Hike

OPS authorizes 17 to 31-cent increase along East Coast in view of higher tanker rates, possible short supply

WASHINGTON.—The Office of Price Stabilization has amended the ceiling-price regulation issued April 5 to permit increases of 17 to 31 cents per barrel in domestic residual fuel oils on the Atlantic seaboard.

The increases were allowed in recognition of anticipated shortages on the eastern seaboard and increases in tanker transportation rates. *(See Market Summary, page 153).*

The OPS is making a study of the five-fold increase in spot charter rates over pre-Korean levels, but since the higher rates were reached before the general price freeze of January 26 and, also, foreign charters are not subject to OPS jurisdiction, the agency decided to adjust residual ceilings without awaiting the results of the study.

To increase imports.—The higher ceilings are expected to encourage imports, which OPS officials felt were threatened by the higher tanker rates. With the spot-market rate from tanker transportation increased from 25 or 30 cents per bbl. to $1.31 since last July, it was pointed out, receivers totally dependent on the spot market for chartering tankers found themselves with an out-of-pocket loss of $1.06 per bbl.

On the other hand, it was noted, most importers either own tanker tonnage or control tonnages at relatively favorable rates, and term charters for next winter have been entered into at about 66 cents a barrel, but this tonnage is not entirely adequate for meeting current demand.

Demand for residual fuel oil on the East Coast last year exceeded 750,000 bbl. daily, more than 20 per cent above 1949, and it is expected that present and prospective demand can be met only by larger imports, which have already risen from 200,000 bbl. a day in 1949 to 350,000 bbl. a day, it was said.

Supply outlook. — California supplies will not be available this year because of inventory and price factors, it was pointed out. Furthermore, refinery operations on the Gulf Coast and eastern seaboard are near maximum capacity and, in addition, the present technological trend in the industry is to reduce residual fuel oil yields in favor of more profitable light products such as gasoline and middle distillates.

The domestic supply could be augmented only through a change in refinery yields, and at existing ceiling prices such a change would be uneconomic, the OPS admitted.

The 752,800 bbl. daily demand for residual on the East Coast in 1950 is expected to increase to about 810,000 bbl. daily this year. "Inventory trends cast considerable doubt on our ability to service this expanding requirement," the OPS commented, particularly since inventories at the end of April were at the lowest point for that date since 1947 in quantity and lower than even 1947 in days' supply.

The OPS study indicated the prospect of an acute supply situation next winter and the desirability of industrial establishments, principally utilities, which are equipped to use coal maximizing such use. It was estimated that the higher ceiling prices may stimulate such conversions, possibly to an extent of 20,000,000 bbl. of residual a year.

Price Strain

I.P.A.A. officials cite high costs, need for crude hike

NEW YORK.—The need for a higher crude-oil price more in line with current costs was emphasized by three officials of the Independent Petroleum Association of America at a luncheon meeting held here by the organization last week

J. Ed Warren, Midland, I.P.A.A. president, pointed out that costs have risen substantially while crude prices have been at the same level since 1947. "Price-control authorities must recognize that this situation cannot be permitted to continue," he said.

Boost justified.—Harold B. Fell, executive vice president of the association, said he personally believed an increase of not less than 10 per cent would be justified. He said a committee of the association is now studying replacement costs in the industry, and that it would provide definite figures later.

Fell said the industry is now selling oil most of which was found in the 30's at a cost of perhaps 40 cents a barrel, when present finding and developing costs are around $2.25 a barrel. He said costs of materials are up about 20 per cent since the first half of last year.

Index compared.—The third official of the association speaking at the meeting, Russell B. Brown, general counsel, commented that since the Korean war, the price index of all commodities has increased 15.8 per cent, while the price index for crude oil has risen less than 1 per cent.

About 75 oil men in the New York area attended the meeting, arrangements for which were made by John M. Lovejoy, vice president of the organization in eastern New York. The discussions given were general reviews of industry affairs.

Pipe situation.—On the subject of pipe, Warren said at the meeting that the general feeling among smaller operators was that the Petroleum Administration for Defense had equitably distributed what pipe is available. He said the fact that the allocations were based on inventories would bring out much pipe now in stock. However, operators were concerned about how these inventories, which they are now required to use up, would be replaced.

There is some doubt, he said, that the normal increase in drilling in the second half of the year will be sufficient to enable the industry to meet its goal of 43,200 wells.

Lovejoy, president of Seaboard Oil Co., said his company had asked for 3,000 to 4,000 tons of pipe and had been allocated 200 tons. He said he understood the same allocation had been made to Amerada Petroleum Corp., and, as another example, Magnolia Petroleum Co. had received no pipe at all for the third quarter.

Demand Forecast

Revised figures point to crude output of 6,027,000 bbl. daily, gain in total demand of 9.5 per cent over 1950

CRUDE production for 1951 is estimated at 6,027,000 bbl. daily in the revised forecast, released by the Bureau of Mines.

This represents an increase of 11.6 per cent over 1950. Production at natural-gasoline and cycling plants is forecast at 559,000 bbl. daily, up 12 per cent.

The revised forecast calls for an increase of 9.5 per cent in total demand to 7,452,000 bbl. daily, including an actual gain of 14.1 per cent in the first quarter and an estimated gain of 11 per cent for the second quarter.

Increases in the third and fourth quarters are 7.6 per cent and 6 per cent respectively.

The downward trend in relative gains for the last half of the year is due to the sharp rise in demand in the third and fourth quarters of 1950 and not to any projected decreases for the late months of 1951.

The high total demand for the year is influenced decidedly by the high level of demand in the first quarter. The daily average for that quarter was only 0.3 per cent less than the demand forecast for the last 3 months of the year. The normal for the period has been about 5 per cent less.

Distillate fuels lead the list in relative gains with an increase of 14 per cent over 1950.

Total gasoline demand is expected to be up 11 per cent, and the same relative gain is assigned to kerosine.

The small gain of 6 per cent for residual fuel is related more to the short world supply than to any lack of potential demand in this country.

The gain for all other products is estimated at 5 per cent.

Total imports are estimated at 943,000 bbl. daily, up 11.3 per cent from the 1950 average. Exports are expected to be about 10 per cent less than last year. However, both imports and exports may be changed by factors relating to world supply and demand.

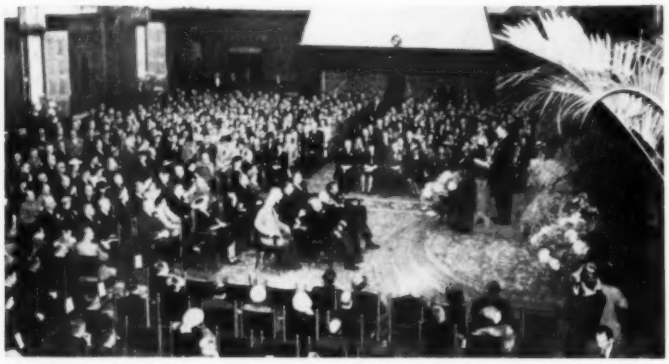
In its original 1951 forecast *(The Oil and Gas Journal, December 14, 1950, page 58)* the Bureau estimated total demand at 7,162,000 bbl. daily. It predicted a figure of 5,732,000 bbl. daily for crude-oil production.

At that time, it said total demand would run about 6.2 per cent over the average of 1950, and crude production would exceed 1950's average by 6 per cent.

BUREAU OF MINES REVISED FORECAST SUPPLY AND DEMAND—ALL OILS

(Thousands of barrels daily)

	Actual first quarter	Forecast: Second quarter	Third quarter	Fourth quarter	Year 1951	Actual year 1950
Production	6,528	6,672	6,558	6,587	6,586	5,900
Crude	5,965	6,134	6,011	6,000	6,027	5,402
Other oils	563	538	547	587	559	498
Imports	926	897	935	1,011	943	847
Crude	484	543	554	565	537	487
Refined	442	354	381	446	406	360
New supply	7,454	7,569	7,493	7,598	7,529	6,747
Stock change	—283	+496	+254	—163	+77	—56
Crude	—162	+215			+14	—13
Other oils	—121	+281	+254	—163	+63	—43
Total demand	7,737	7,073	7,239	7,761	7,452	6,803
Motor fuel	2,732	3,265	3,337	3,076	3,104	2,792
Residual	1,827	1,523	1,533	1,728	1,652	1,559
Distillate	1,724	954	956	1,467	1,274	1,116
Kerosine	473	268	283	435	364	329
Other	981	1,063	1,130	1,055	1,058	1,007
Exports	291	284	272	250	274	304
Crude	89	77	65	65	74	95
Refined	202	107	207	185	200	209
Domestic demand	7,446	6,789	6,967	7,511	7,178	6,499
Motor fuel	2,666	3,198	3,272	3,022	3,041	2,725
Residual	1,788	1,485	1,489	1,893	1,614	1,515
Distillate	1,694	917	924	1,435	1,241	1,081
Kerosine	469	262	277	429	359	323
Other	829	927	1,005	929	923	855
Runs to stills	6,492	6,331	6,430	6,433	6,421	5,739



CONGRESS IN SESSION.—Delegates from member nations are shown here as they gathered in the Hall of Knights in The Hague at the opening of the Third World Petroleum Congress. Speaking at right is Prof. J. R. M. van den Brink, Netherlands Minister of Economic Affairs.

New Pricing Base?

Oil prices, long based on Gulf Coast quotations, soon to be set in Middle East, Levy tells Hague listeners

Kenneth B. Barnes

THE HAGUE.—World prices for petroleum eventually will break away from their historic basing on quotations at United States ports on the Gulf of Mexico, and Middle East oil will set the schedule for most of Europe and the Eastern Hemisphere.

This prediction was made to the World Petroleum Congress here this week by Walter J. Levy, New York consulting economist. He forecast a gradual transition, influenced by local economic, political, and transportation factors.

Digests of important papers presented at the Third World Petroleum Congress appear in this issue beginning on page 90.

Completion of Europe's refinery program, Levy said, will reduce its imports of finished products to a minimum, and Middle East crude will supply most of Europe's import needs, with a top price about equal to Caribbean crude delivered to the same ports.

The basic quotation for Middle East crude will be the Persian Gulf, and pipe-line charges to the eastern Mediterranean will be kept close to tanker rates. Middle East refined products will be marketed mainly east of Suez and will find prices independently of United States gulf prices.

Caribbean crude and refined prices will have a lower limit approximately equal to the United States gulf quotations minus import tax, and an upper limit equal to this plus transportation advantage to market south of the United States, according to Levy's calculations.

Porter speaks.—Principal speaker at the formal banquet of the congress was Frank M. Porter, president of the American Petroleum Institute, New York, who called the meeting an example of international cooperation which could point out the road to world peace.

Other subjects.—Petrochemical processes and new chemicals from petroleum held chief interest of the delegates at the refining sessions of the congress this week.

The world shortage of fats, particularly acute in Europe, focused attention on the growing trend of displacing soap with synthetic detergents derived from petroleum.

A paper by Foster D. Snell, New York consulting chemist, which was one of several on this subject, stated that production of these detergents has increased 10-fold during the past decade and last year equaled about one-quarter of all the cleansers used in the United States and about one-tenth the total in the United Kingdom.

It was predicted that the British will increase the use of petroleum detergents to 40 per cent of total cleansers this year, and that the same trend will be apparent in other countries.

Payne Sells Interests

OKLAHOMA CITY. — Harold L. Rowley, Shreveport, La., drilling contractor, in a stock transfer last week, acquired the outstanding one-half interest of William T. Payne, Oklahoma City contractor, in LaGrange Petroleum Corp. and Big Chief Drilling Co., both of Natchez, Miss., and Big Chief Western Drilling Corp. of Farmington, N. M. Consideration was not disclosed.

Payne said that the parent company, Big Chief Drilling Co. (Del.), Oklahoma City, which he heads, was not affected in any way in the transaction. Rowley has been affiliated with the parent company since its organization in 1936.

Big Chief Western Drilling Corp. currently operates seven rigs in the San Juan Basin in northwestern New Mexico and southwestern Colorado, and Big Chief Drilling Co. of Mississippi is running four rigs in Louisiana, Texas, and Mississippi.

LaGrange Petroleum Corp. owns producing properties in LaGrange field of Adams County, Mississippi, in Illinois and in East Texas.

New Process

Socony-Vacuum will build commercial cat reformer

NEW YORK.—The first commercial unit of a new catalytic reforming process will be built by Socony-Vacuum Oil Co., Inc., at its Augusta, Kans., refinery.

Termed the Thermofor Catalytic Reforming Process, the new technique comes out of the research and development department of Socony-Vacuum Laboratories, Paulsboro, N. J.

The Augusta unit will have a capacity for processing about 3,000 bbl. per day of naphtha feed stock. It will differ from other cat reforming processes principally in its provisions for continuous regeneration of catalyst, which will circulate through the reactor and regenerator vessels in a moving bed similar to that employed in the Thermofor catalytic cracking process.

As in other cat reforming processes, T.C.R. will provide for recycling hydrogen-rich gas to the reactor. The resulting suppression of carbon deposition on the catalyst will reduce the required catalyst circulation to approximately one-tenth the rate required in the air-lift T.C.C. process.

The new T.C.R. unit at Augusta will use an entirely new catalyst in bead form.

Reactor pressure will be maintained at approximately 175 psig., which is lower than reactor pressures employed in other cat reforming processes.

Design data are being obtained from a 50-bbl. per day pilot plant in operation at Paulsboro.

***CONTINUOUS SYSTEM.**—Existing lines and connecting 8 and 10-in. links which, when completed, will give Gulf Oil Corp. a continuous products system from Beaumont, Tex., to Nashville, Tenn.*

New Products Line

Beaumont-Nashville system planned in 1952 by Gulf

HOUSTON.—A products system between the Beaumont-Port Arthur area and Nashville will be built next year by Gulf Oil Corp.

Construction will involve links between existing lines. Gulf will build a 10-in. line from its Lufkin station in East Texas to El Dorado, Ark., and a combination 8-in. and 10-in. line from Helena, Ark., to Nashville.

Existing facilities to be utilized in the project consist of two lines: (1) A crude-oil line converted to products service in the Port Arthur-Lufkin section of Gulf's multiple-line trunk system from West Texas to the Gulf Coast, and (2) Project Five Pipe Line Corp.'s 149-mile, 10-in. products line from El Dorado to Helena.

The Project Five system was built as a war measure in 1942 and has been operated as a Gulf affiliate in connection with pipe-line facilities from the Gulf Coast converted from crude oil to products service.

Take-off terminals along the proposed Beaumont-Nashville system will be operated at Nacogdoches, Tex., Shreveport, and Memphis.

Actual construction will start next year when salvaged pipe will be available from take-up operations in Gulf's West Texas trunk line.

Gulf's facilities for moving West Texas crude oil will be increased by construction of West Texas Gulf Pipe Line Co.'s 450-mile, Colorado City to Wortham, Tex., 450-mile, 24 and 26-in. line.

MEETINGS

Power Conference

DALLAS.—Plans are being completed for the twenty-third annual conference and exhibit of the Oil and Gas Power Division, American Society of Mechanical Engineers, which will be held at the Baker Hotel here June 25-29.

Papers on various aspects of the petroleum industry will be presented during the 5-day meeting. Among these will be:

"The Effect of Charge Temperature and Pressure on Rating of Diesel Engines and a Variable Compression Ratio Supercharging System for 2 and 4 Cycle Internal Combustion Engines," by Ralph Miller, chief engineer, Four Cycle Diesel Engine Division, Nordberg Manufacturing Co., Milwaukee; "Damage Prevention From Diesel Engine Crankcase Explosions," by A. C. Cavilleer, head, Large Diesel Engine Branch, Internal Combustion Engine Laboratory, U. S. Naval Engineering Experiment Station, Annapolis; "Diesel Engine Crankcase Explosion Investigation," by G. W. Ferguson, The Texas Co., New York.

"Fuel Preparation," by D. E. White, superintendent of maintenance, Magnolia Pipe Line Co., Dallas; "Water Treating Problems," by O. H. Moore, director, engineering and research, Tennessee Gas Transmission Co., Houston.

Water-Flood Conference

ASHLAND, Ky.—Aspects of water flooding in western Kentucky will be discussed at the annual midyear meeting of Kentucky Oil and Gas Association, which meets at the Henry Clay Hotel here June 21-22.

In addition to the water-flooding program, which will be outlined by J. R. Vaughan, Jr., Sun Oil Co., and Leon Kraus, Ashland Oil & Refining Co., petroleum engineers, the future oil prospects of Kentucky will be detailed by Iley B. Browning, Sr., petroleum geologist. John V. Goodwin, superintendent of production, and a geologist with Equitable Gas Co. System, will discuss gas storage.

SOUTHWEST

Scurry Unit?

Operators give tentative approval to immense plan

FORT WORTH.—Plans for unit operation of the Canyon reef fields of Scurry County, largest oil pool in West Texas, received preliminary approval by a committee of operators meeting here May 31.

An engineering report indicated that ultimate recovery might be doubled by injection of both gas and water and operation of the entire area as a unit. The area involves three fields—Diamond M, Sharon Ridge, and Kelly-Snyder—which are believed to constitute a single reservoir.

The meeting was attended by 41 operators, representing 75 per cent of the operators of producing wells in the Canyon reef. D. R. Snow, vice president of Sunray Oil Corp., Tulsa, is chairman of the committee.

The group endorsed unitization and pressure maintenance on the basis of tests which show the Canyon reef formation to be unusually well adapted to increasing recovery by injection of gas and water. The tests were based on pilot injections in three wells in the approximate centers of the three fields.

The reef area involves approximately 80,000 acres on which about 1,800 oil and gas wells are now producing. More than 250 separate leases, approximately 90 operators, and more than 5,000 royalty owners would be involved in the pooling and unitization plan, and agreement must be obtained from substantially all parties.

A proposed unitization agreement was submitted by the committee's legal group. Details of this and of the proposed engineering program will be studied by all operators, and another meeting will be held soon.

Priorities Help

M-46 completely rewritten; PAD now able to provide priorities assistance for all U. S., Canadian operators

WASHINGTON. — The Petroleum Administration for Defense is now in position to provide priorities assistance for operators in all branches of the oil and gas industry in the United States and Canada.

PAD also has assumed control over construction in the industry, formerly governed by NPA Order M-4 which contained provisions with which oil operators could not comply.

The extended authority was granted the agency in a revision of the M-46 order, which originally provided priority assistance only for maintenance, repair and operating materials, and oil-country tubular goods for United States operators, and a new order, M-46B, divorcing the industry from control under M-4 and setting up special rules governing construction of additional facilities.

How it works.—The M-46 order was completely rewritten. It provides priorities assistance, under differing rules for each, for casing and tubing, drill pipe, and all other materials, and further breaks down casing and tubing and drill pipe into two groups —normal requirements and emergency requirements.

In general "normal requirements" are the quantities of casing and tubing or drill pipe necessary to meet an operator's projected quarterly drilling program, including exploratory wells.

"Emergency requirements" are those quantities found necessary to carry out exploratory operations, drilling obligations, etc., in circumstances where sufficient materials are not on hand, readily available, or otherwise obtainable without the use of priorities assistance. The DO-48 rating is provided for normal requirements and the DO-48E rating is applied to emergency needs.

To secure authority to apply the DO-48 rating, an operator must file his Form PAD 17 report for each district in which he will use material applied for. These reports will be required on a quarterly basis, and reports on deliveries for the fourth quarter must be filed by June 30, while the report of inventory and requirement (Form PAD 17DP) must be filed by June 15. Delivery orders for other material may be filed at any time convenient to the operator but should be in sufficient time to permit placement of orders with the supplier for delivery in the quarter when delivery is wanted.

Reports for subsequent quarters must be filed at least 3 months prior to the beginning of the quarter in which delivery is to be made (Form PAD 17) and inventory and requirements reports (Form PAD 17DP) must be filed 3½ months in advance.

What is covers.—The order provides priorities assistance for all types of production operations, which means any use of material for expansion, improvement, maintenance, repair or replacement incident to production, with some exceptions.

Provision is made for priorities for construction operations, including expansion, improvement, reconstruction, remodeling, alteration, maintenance, repair or replacement incident to any branch of the oil and gas industry other than production, but including production office and camp facilities.

Separate rules are set up for large construction operations, in which the total cost of controlled materials to be used is $5,000 or more or in which the total cost of materials will be $5,000 or more; and construction costing less than $5,000. This was done because of the necessity, prior to granting assistance, to reviewing the essentiality of all proposed construction which uses large quantities of material.

There may be certain types of material which by virtue of special prohibitions of NPA cannot be obtained as MRO, and in securing such materials for small construction operations the operator must certify that the rating has been officially authorized.

Special cases.—While in general operators will be authorized to apply the rating without submitting delivery orders for approval, there are two instances where such orders must be submitted, whether the material is for MRO or for production or construction operations.

Every delivery order for a controlled material in the total amount of $25 or more must be submitted for approval unless the use of priorities assistance has been authorized through application on Forms PAD 15, 17, and 17DP, or 26.

Every delivery order for other than a controlled material must be submitted for approval if it is for a total amount of $5,000 or more or if any single item costs more than $1,500, unless the priorities assistance has been authorized through application on Form PAD 26.

An operator must submit for information any delivery order for a total of $500 or more, but less than $5,000, containing no single item which costs more than $1,500, unless the use of priorities assistance has been authorized through application on Forms PAD 15 or 26.

The M-46 order also permits an operator to use the DO-97 preference rating to restore his inventory of material to a practicable working minimum where his inventory has been depleted through the use of MRO material or material necessary to a production or construction operation, provided that no delivery of material which would result in surplus material may be accepted by the operator.

Who is affected.—All of the provisions of the order are equally applicable to Canadian operators, who will file their applications and reports with the petroleum division of the Canadian Department of Trade and Commerce in Toronto.

The construction order M-46B applies only to operators in the United States, its territories and possessions. It does not apply to tank cars, tank trucks, railroad rolling stock, tankers, barges or other mobile marine equipment, or to the construction of service stations.

Steel for Tanks

PAD allots 15,000 tons for storage at icy ports

WASHINGTON. — Seeking to avoid a repetition of spot shortages which occurred last winter, the Petroleum Administration for Defense has authorized 22 firms to use DO-48 ratings on orders for nearly 15,000 tons of steel during the coming quarter for construction of 3,167,500 bbl. of tank storage at 23 ice-bound ports in 8 states.

PAD's action was based on a new delegation of authority from the National Production Authority to assign the defense-order rating to purchases of steel required for the construction of petroleum and gas-storage facilities.

A total of 35 authorizations were issued to the 22 companies as a result of a PAD survey of oil-storage needs in relation to transportation facilities at water terminals normally closed to navigation during the winter season.

Storage at these points proved inadequate last winter, and resulted in spot shortages. To avoid a recurrence of that situation, PAD ordered the companies to purchase their steel immediately for delivery as early in the third quarter as possible.

PAD also has granted priorities assistance to 33 utility companies, L.P.G. distributors, and natural-gasoline plants to obtain approximately 4,400 tons of steel for storage of liquefied petroleum gas.

WATCHING WASHINGTON

Bertram F. Linz

Future Oil Policy

Formulation of a national oil policy, under study for years at the Capitol, may be taken out of the hands of Congress by President Truman.

A materials-policy commission appointed by the President last January has completed its preliminary work and is about to get down to determining long-range needs of the United States for raw materials, including oil, and how those needs can be met.

The commission is not concerned with the problems of the current defense program but with those of the years to follow the quieting of the present international unrest—a whale of a job considering the uncertainty of the future of a large part of the world.

The study will cover the long-range requirements outlook; the long-range supply outlook; the prospect and estimated extent of shortages; the consistency and adequacy of existing government policies, plans, and programs; and the consistency and adequacy of private industry practices.

The commission is expected to cover all fuels in the course of its study, but petroleum will be the most important in that field since it is the one fuel of international significance.

Foreign Investments

The Department of Commerce is making a study to ascertain how much money has been invested in oil and other development abroad by American interests since the end of the war.

Before the end of July all persons having an interest in a direct investment outside the United States consisting of 25 per cent or more of the voting securities of a foreign enterprise are required to file information on forms now being distributed by the department.

From the reports, the department will compile information, as of December 31, 1950, on the size and composition of American direct investments abroad, foreign earnings of companies operating outside the United States, and various types of transactions between American parent organizations and subsidiaries.

The last such study was made by the Treasury Department during the war in 1943. The total then invested abroad by Americans amounted to approximately $7,200,000,000, of which some 19 per cent was in petroleum enterprises.

"Biggest Bonanza"

A House committee has been studying the manner in which certificates for accelerated amortization of defense plants have been granted and recommends that Congress step in and make some rules for "the biggest bonanza that ever came down the government pike."

Looking over some of the certificates granted, the committee learned that with a certificate and a defense loan it is possible to put up a multimillion dollar plant with only a nominal private investment.

A case in point was that of a company organized with a paid-in capital of $600 and an abandoned race track (donated). It planned to build a steel plant. The company secured a certificate for 85 per cent amortization of the $4,275,000 cost of the plant, although later the iron and steel division of the National Production Authority recommended that no certificate be granted. It also was given a $7,800,000 loan under the Defense Production Act despite an adverse report by the Reconstruction Finance Corp. The loan was subject only to a condition that the company provide $1,000,000 in capital.

One thing the committee did not like was that an aviation-gasoline plant, with no probable peacetime utility whatever, rightfully could get 100 per cent amortization, and a steel plant with an assured long life and excellent chance of a post-emergency market could get 85 per cent. The small 15 per cent difference, obviously, is insufficient compensation for the risks assumed by the facility constructed solely for war service, it commented.

The committee also questioned why no certificates were granted for less than 50 per cent. It pointed out that, in a steel plant having 25 years' usefulness, 40 per cent accelerated amortization would permit a 55 per cent write-off of the investment in 5 years, leaving 20 years for normal write-off of the remainder. The only explanation it could give was that of Interior Secretary Oscar L. Chapman—failure to differentiate between compensation for unusual risk plus normal profit, and providing for an added incentive in the form of extraordinary profit.

The oil industry got the former from PAD, the steel industry got the latter from NPA.

Tidelands Action

House to study problem; tired of stall in Senate

WASHINGTON.—Disappointed over the failure of the Senate interior affairs committee to act on tidelands, House leaders moved this week to get quick action on legislation which would permit resumption of off-shore exploration and development.

At the request of Speaker Sam Rayburn of Texas, Congressman Francis Walter of Pennsylvania, chairman of the subcommittee handling the legislation, scheduled a 1-day hearing for proponents of federal ownership.

The subcommittee will hear Attorney General J. Howard McGrath, Secretary of the Interior Oscar L. Chapman, and Rep. Emanuel Celler of New York, chairman of the full committee and strong supporter of the O'Mahoney resolution for interim federal management which he sponsored in the House.

Supporters of state ownership say the committee will quickly vote approval of the quitclaim bill introduced by Walter after the hearing.

The hearing was to have been held last month but was called off when there were indications that the Senate group was about to act. However, Sen. Josph C. O'Mahoney of Wyoming, chairman of the committee, has been attempting to sit on the legislation after it was voted last month to amend his interim resolution to provide for state management.

Rayburn pointed out that the House has been waiting several months for the Senate to act, so that the House committee could know Senate sentiment before taking up the matter. An earlier move to secure House consideration, he said, would have been a mistake but, he added, "I think this is the psychological time for the House to move."

Defense Orders

WASHINGTON.—The following orders have been issued by the National Production Authority:

Amendments to M-9 and M-15, May 28: Directing a larger share of the available supply of zinc to the defense program and essential production.

Amendment to M-38, May 28: Increasing the availability of lead for defense orders.

Delegation 13, May 29: Authorizing the Petroleum Administration for Defense to assign priority ratings to purchase orders for steel required in construction of oil and gas-storage facilities.

Order M-66, May 31: Placing artificial graphite products and carbon electrodes under allocation July 1.

Order M-65, May 31: Providing for

the recovery of metal from obsolete printing plates.

Amendment to M-7, June 1: Providing for seasonal changes in retail aluminum parts assembly.

Amendment to Delegation 13, June 1: Permitting the Petroleum Administration for Defense to impose conditions in connection with authorizations for procurement of steel for storage facilities.

M-47, June 1: Limiting the use of aluminum foil for packaging.

Amendment to M-46, June 1: Establishing priorities assistance for all segments of the U. S. and Canadian oil and gas industry.

M-46B, June 1: Providing specific control of construction of oil and gas facilities formerly under M-4.

Amendment to M-47, June 2: Setting limitations on the use of iron and steel in consumer durable goods in the third quarter.

Foreign-Operations Chief

WASHINGTON.—James A. Thomas, recently retired manager of the Parkersburg Rig & Reel Co., has been appointed as the New York representative of the foreign-petroleum-operations branch of the Petroleum Administration for Defense.

Thomas, who was with the derrick division of Superior Tube Co., Tulsa, from 1922 until he joined Parkersburg Rig & Reel in 1926, will act as liaison between PAD and the companies with foreign operations.

CANADA

Crude-Line Hearing

Authorization for crude-oil system between Edmonton and Vancouver may follow current hearing in Calgary

CALGARY.—The first crude-oil pipe line from western Canada to the Pacific Coast may be authorized as the result of hearings held in Ottawa this week by the Board of Transport Commissioners of Canada.

Three proposals for a pipe line from Edmonton, Alta., to Vancouver, B. C., are now pending before the board. Several months ago hearings were held on applications of Trans-Mountain Oil Pipe Line Corp. and Alberta Pacific Oil Pipe Line Co.

Recently preliminary engineering had been done for a new company, Independent Pipeline Co., which proposes immediate building of a 721-mile, 12-22-in. crude-oil line from Edmonton to Vancouver, B. C. Hearings on the project began June 4. It is understood that if permission be granted it would be for only one of the proposed projects.

Independent. — Independent Pipeline Co. is headed by Robert Brown, of Brown, Moyer, Brown, oil producers, Looheed Building, Calgary Alta. Engineering for the project has been done by Williams-Connors-Stanfield of Tulsa, an engineering firm which is prepared to let contracts and manage construction. J. L. Culbertson, former chief engineer, Texas Pipe Line Co., has served as consultant to Williams-Connors-Stanfield, a partnership of S. Miller Williams, David R. Williams, Guy S. Connors, and Cecil A. Stanfield.

Cost of the project is estimated at $80,000,000. The 721 miles of line would comprise 185 miles of 22-in., 391 miles of 20-in., 50 miles of 18-in., and 95 miles of 16-in. The route would follow a railroad in crossing mountains through Yellowhead Pass at an elevation of 3,870 ft.

Daily capacities have been estimated for operation with different station setups as follows: two stations, 50,000 bbl.; three stations, 75,000 bbl.; five stations, 110,000 bbl.; six stations and a loop, 150,000 bbl.

Trans-Mountain.—Trans-Mountain Oil Pipe Line Co., sponsored by S. D. Bechtel, president of Bechtel Corp. and chairman of the board of Canadian Bechtel, Ltd., proposed early this year to build a 715-mile crude oil line from Edmonton to Vancouver with initial throughput capacity of 75,000 bbl. per day. Ultimate throughput with additional pump stations would be approximately 200,000 bbl. *(The Oil and Gas Journal, March 27, 1951, page 71.)*

Alberta Pacific.—An earlier proposal of Alberta Pacific Oil Pipe Line Co. headed by A. Faison Dixon of Brokaw, Dixon & McKee, was for a 950-mile, 16-in. line to extend from the Edmonton area south into the United States via Kingsgate, B. C., and thence across the State of Washington to a terminal at Vancouver, B. C. *(The Oil and Gas Journal, January 11, 1951, page 56.)*

The products market in the Pacific Northwest area is reported as approximately 250,000 bbl. daily. The three existing British Columbia refineries have total crude capacity of approximately 28,000 bbl. daily.

Products Line Planned

SARNIA, Ont.—Imperial Oil, Ltd., is planning construction of a 194-mile products pipe line from Sarnia to Toronto.

Shipments of English pipe for the project are expected to arrive during the third quarter.

The Sarnia-Waterdown section will be 12-in. pipe and the Waterdown-Toronto section 10-in. From Waterdown to Hamilton the company will lay two parallel 6¾ mile, 6-in. lines for segregating light and heavy products.

Long Search Rewarded

EDMONTON.—Texaco Exploration Co. and McColl-Frontenac Oil Co. brought in their first Alberta crude-oil discovery last week 28 miles southwest of here to climax 11 years of effort and expenditures of more than $10,000,000.

The well, Texaco-Wizard Lake 2, has completed experimental flow tests and is now ready for steady production at a rate to be set by the Conservation board.

The well, 5 miles southwest of Leduc field, produced over 200 bbl. of 36°-gravity crude in a 1-hour open-flow test from the top 11 ft. of Devonian D3 reef. It flowed at the rate of about 500 bbl. daily through a ½-in. choke. Casing pressure ranged up to 1,740 psi., and tubing pressure up to 1,100 psi. on restricted-flow tests. Gas-oil ratio was around 500 cu. ft. per barrel.

The Devonian D-3 was the deepest of three oil-pay zones found. The well discovered a thick oil-bearing Devonian D2 section and indicated commercial production in basal Cretaceous sand. It also found gas in Viking sand.

Work Begins on Cracker

SARNIA, Ont.—Construction originally scheduled for late summer or early fall has already begun on a 25,000-bbl. per day fluid catalytic cracking unit at the Sarnia, Ont., refinery of Imperial Oil, Ltd. The new unit, largest to be built in Canada, is part of a refinery-wide expansion program which will increase crude-processing capacity from 55,500 to 71,000 bbl. per day.

A new 46,500-bbl. per day atmospheric and vacuum-distillation unit will make way for the retirement of existing crude units and at the same time increase plant capacity 28 per cent.

The $14,000,000 program is scheduled for completion in 1952. The cat cracker, crude unit, and new light-ends-recovery facilities are being constructed by Canadian Kellogg Co., Ltd., subsidiary of the M. W. Kellogg Co., New York.

Imperial is also adding 3,000,000 bbl. in crude-storage capacity to the Sarnia plant to provide stocks of Alberta crude for refinery runs during the winter months of closed navigation on the Great Lakes. Tankage is being erected by Horton Steel Co. of Canada and the Toronto Iron Works.

WEST COAST

PIPE PREPARATION.—Cleaning and reconditioning yard near San Miguel, where the screwed-end pipe was prepared for welding and then double-jointed into 40-ft. sections. Before being trucked to the right-of-way, the sections were hydrostatically tested at 900 psi., as shown in the right foreground.

San Ardo Outlet

Blended crude to move through new line soon

LOS ANGELES.—Within the next month heavy San Ardo crude is expected to start moving through a new pipe line being completed by General Petroleum Corp. between the northern California field and a new sea-loading terminal near Cayucos on Estero Bay.

Laying of the 40-mile, 8-in. line has been completed and work on loading-terminal facilities and three steam-powered pump stations is progressing on schedule.

Work on a parallel 4-in. line, through which light oil will be shipped from the terminal to the field for blending with the highly viscous crude, also is nearing completion.

Pipe for the 8-in. line and major equipment in the three stations was salvaged from the company's old Mojave line.

About a 98 per cent recovery was effected of the 38-year old pipe. After it had been removed from the old line and moved to a central plant, the threaded pipe was cleaned, prepared for welding, and then double-jointed in 40-ft. sections. This reconditioning work was done near San Miguel.

Because of the crude's stickiness, facilities are being provided at each station for heating the blended crude to a temperature of more than 170° F.

The entire project, costing in excess of $2,000,000, is being carried out by Bechtel Corp.

Oil Legislation Lacking

SACRAMENTO.—With the state legislature set to adjourn the latter part of this month, little of direct importance to the petroleum industry is expected to result for this session.

One bill which may yet come out of the legislative hopper would establish the State Division of Oil and Gas as the official agency for compiling statistics on California drilling and producing activities. Currently this is being carried on by the voluntary California Conservation Committee. Thus other than giving such statistics an official stamp there would be but little change.

Throughout the session an effort has been made to introduce legislation which would provide a 2-cent increase in the state gasoline tax. Its sponsors, however, have been unable to build up sufficient support to start any such measure rolling.

When the current session opened last January it was anticipated that an intensive effort would be made to secure the passage of state oil-conservation measures. Several independent groups were backing the effort. The bill was never introduced, however, because of Gov. Earl Warren's request that legislative activity be limited to bills of a defense or otherwise urgent nature.

GULF COAST

Ponchartrain Interests Sold

NEW ORLEANS.—Cabot Carbon Co., Boston, has purchased a three-quarter interest in four shut-in gas-condensate wells in Lake Ponchartrain, and authoritative sources said the gas output would "probably" be used in a chemical plant to be erected in St. Tammany Parish.

Officials of Cabot Carbon are expected to visit New Orleans within the next few weeks, at which time the exact location of the plant is expected to be announced.

Cabot has several million dollars worth of carbon-black plant construction under way in St. Mary's Parish.

Gas reserves in the single gas-condensate sand at 7,200 ft. have been estimated at 35 to 50 billion cubic feet based on discoveries to date. Geologists' reports indicate, however, that prospects for deeper production are excellent and further drilling may show the reservoir to be much greater than that outlined by the four wells.

The four wells are located in the eastern end of Lake Ponchartrain about 1½ miles south and slightly east of the mouth of Bayou Lacombe.

Cabot purchased the interest from Lynn Oil Co. and Temple Hargrove, independent producer. The other quarter interest is held by Atlantic Refining Co.

New Depth Record

NEW ORLEANS. — Louisiana's deep-drilling record has been broken at a Shell Oil Co. well in Weeks Island field, Iberia Parish, which has penetrated to 16,276 ft.

The venture, 1 H. T. Gonsoulin, 41-14s-7e, passed the old record set by Placid Oil Co. 1 City of New Orleans, Lafourche Parish, which is bottomed at 16,237 ft.

Shell also holds the producing-depth record in Louisiana at 2 Weeks Gall State Unit 2. The well produces from 15,148 ft. and is also located in Weeks Island field.

This is the first well drilled below 16,000 ft. in Weeks Island field. Shell has drilled one well below 15,000 ft. and five below 14,000 ft.

New Pays Found

Amerada discovery finds oil between 11,500, 12,000 ft.

At least two additional oil and gas reservoirs were indicated on drill-stem tests last week at Amerada Petroleum Corp.'s successful North Dakota wildcat 8 miles south of Tioga in Williams County, and the firm announced two more wildcats for the Williston basin.

The company's 1 Clarence Iverson, C SW SW 6-155n-95w, recovered 4,500 ft. of gas and oil-cut mud on a 3-hour drill-stem test at 11,795 ft. with packer set at 11,736 ft. Fluid in the last eight stands was 30 per cent oil.

Earlier, following a 4½-hour drill-stem test run at 11,852 ft. with packer set at 11,734 ft., recovery was 540 ft. of gas-cut mud, 630 ft. of oil and gas-cut mud, and 3,400 ft. of sulfur water. Early this week crews were drilling ahead below 11,900 ft.

Deepening was started mid-May from a total depth of 11,744 ft. after the well produced 53.4° to 55.2°-gravity oil for several weeks from Devonian dolomite through casing perforations between 11,630 and 11,660 ft.

Williston wildcats.—Meanwhile, Amerado staked location for 1 Harry Bakken, C SW NW 12-157n-95w, a Williams County wildcat 12 miles north of the Iverson test; 1 Bakken lies 1 mile west of the Williams-Mountrail county line and 40 miles northeast of Williston.

Stakes were also driven last week for 1 Binhomer-Risser, C SW SE 12-149n-96w, on the Croff prospect in eastern McKenzie County. The well lies southeast of Schafer, the county seat, and 7 miles west of the Fort Berthold Indian Reservation. Amerada's Iverson wildcat lies 36 miles due north.

In eastern Morton County, 10 miles north of St. Anthony, Phillips Petroleum Co., operator, and Carter Oil Co. are drilling below 7,579 ft. at 1 fee, C NE NW 29-136n-81w. This test is 148 miles southeast of the Iverson discovery well.

In northeastern North Dakota, Union Oil Co. of California was drilling below 1,565 ft. at its 1 fee, C NW NE 28-159n-63w, near Langdon in Cavalier County.

Southern Saskatchewan. — Shell Oil Co. last week initiated its deep exploratory campaign for southern Saskatchewan. Fourteen miles north of the International border, and 100 miles northwest of the Amerada-Iverson well, Shell crews moved in a rig for a 10,000-ft. test. The site is 85 miles due south of Regina. Stakes were driven for 1 Big Muddy Lake, 710 ft. from the south line and 2,000 ft. from the west line of LSD 15, Section 12-3-21, w2. Location is 3½ miles northeast of Big Muddy Lake and 6 miles northwest of Minton railpoint

Shell owns a series of large acreage blocks of Crown permit land northeast and west of the Big Muddy Lake prospect, all in southern Saskatchewan extending down to the border.

Taylor Drilling Co., Lewistown, Mont., drilling contractor, has moved in heavy-duty rig for the Sohio group to drill a 6,300-ft. wildcat 32 miles northeast of Davidson in southern Saskatchewan. It will be 2 Venn, in LSD 4, Section 28-29-24w2.

New Home of Transcontinental

Transcontinental Pipe Line Corp. has moved into its new office building. The windowless building is three stories high but, because of its length and width, has 72,500 sq. ft. of office space. It contains Houston's largest gas-fired absorption air-conditioning system, with a capacity equal to 520,000 lb. of ice per day. At the rear is a 300-ft. tower which connects the Houston office with a microwave system paralleling the company's 1,840-mile Texas-New York pipe line.

Uinta Basin Discovery

VERNAL, Utah. — A new oil-field for the Uinta basin was assured last week on the Duchesne prospect in Duchesne County, Utah.

Carter Oil Co. 1 Ute Tribal, C SE NE 17-4s-4w, recovered 1,260 ft. of oil and gas-cut mud on a 40-minute drill-stem test from 7,544 ft. with packer set at 7,499 ft.

The well developed 745 psig. flowing pressure at tubing-head and threatened to blow out at that point. At the end of the test, the packer failed, and the well started kicking out 12-lb. mud. Crews increased weight to 13 lb. prior to retesting the zone. The crude tests 37.5°-gravity oil with a pour point of 90°-95°.

Earlier, cores showed fracturing in this basal Green River (Tertiary) zone. Drill-stem test behavior was similar to that logged in this formation at Roosevelt field, situated 25 miles to the northeast.

Industry Briefs

OKLAHOMA CITY. — Oklahoma's June allowable last week was left unchanged at 499,905 bbl. daily. Purchasers had nominated 527,586 bbl. daily. There has been no change in the Oklahoma allowable since March.

CINCINNATI.—The public and all segments of the oil industry will be urged to make maximum use now of transportation and storage facilities for heating oils as protection against an expected 10 per cent increase in fuel-oil demand this winter. The American Petroleum Institute Division of Marketing voted to create a special committee of marketers to conduct the campaign.

DENVER. — A 30-hour training course designed to increase workers' proficiency and safety and further the conservation of gas will be taken into the field to oil workers throughout the country next year, the American Petroleum Institute's Division of Production midyear standardization conference was told here. John A. Ritter, Sun Oil Co., Dallas, said the course, being prepared by the A.P.I. vocational-training subcommittee in cooperation with the University of Texas, will be taught by traveling instructors using trailer-mounted demonstration equipment.

AUSTIN.—Action on the natural-gas tax has bogged down in the Texas Legislature. A house bill calling for a gathering tax on gas has been rejected by the senate, and a bill from the senate calling for an increased production levy on gas has been rejected by the house.

INTERNATIONAL

MIDDLE EAST

Optimism in Iran

Anglo-Iranian officials to go to Teheran in response to government note soliciting nationalization "suggestions"

Dahl M. Duff

DEVELOPMENTS in Iran took a more hopeful turn last week as Anglo-Iranian Oil Co., Ltd., informed the Iranian Government it was sending representatives to Teheran as soon as possible for "full and frank discussions" on the future of its properties.

This move was the company's answer to the government's demand made earlier that Anglo-Iranian submit suggestions within 5 days on ways to carry out the nationalization law. In a letter delivered to the Iranian finance minister, Anglo-Iranian said it was impossible to advance proposals within the time limit and that it believed face-to-face discussions were preferable.

The Anglo-Iranian delegation to Teheran is expected to include directors and other top company officials.

The possibility of a successful outcome of the discussions depends in part on what restrictions the Iranian Government places on the scope of the forthcoming discussions. Mahmud Nesabi, chairman of the new three-man management board, said he would ask the British at Abadan to continue operations until July 1, but that during that time the British would have to pay Iran for all export.

Conditions. — The Iranian memorandum to the company made the following points:

1. As a temporary management group, a board of three persons will be named by the government to function under supervision of the joint oil commission of the government. This board will have full authority in production, refining, and distribution.

2. Until such time as the bylaws of the proposed Iranian National Oil Co. have been approved, the temporary board will base its actions on the regulations of Anglo-Iranian, except where they may conflict with the nationalization law.

3. From May 30, Iranian and foreign employes of the company are considered to be personnel of the Iranian National Oil Co.

4. The temporary board will seek to carry out existing operating programs and strive to increase oil production.

5. The board will allow present buyers of Iranian oil 1 month after the board's arrival in Khuzistan (the province in which Anglo-Iranian's operations are located) to arrange to continue their purchases of oil under the priority which the government has agreed to give them.

British concede. — Britain's present willingness to concede some form of nationalization of the Iranian oil operation was officially confirmed last week in the House of Commons by the British foreign secretary, Herbert Morrison. However, he said the settlement must be "otherwise satisfactory," and that Britain was insisting that the issue be settled by negotiation.

In oil industry circles, the belief was that the company is prepared for an arrangement with the Iranians under which it would buy, at discount prices, crude produced in the nationalized operation. Present personnel would continue in their positions.

Opposing pressures. — The Iranian Government is now subject to two opposing pressures. The foreign representations that have been made, including that from the United States as well as several oil-consuming countries including Pakistan and Turkey, apparently were having some effect on the government in Teheran.

On the other hand, the Iranian officials were influenced by continued clamor among its own people for nationalization. The slightest sign of compromise was bitterly denounced.

The fact that Iran has been searching for technical and administrative assistance to operate the nationalized industry was reflected in an announcement in Stockholm. The Swedish Government said it had turned down an Iranian request to send Swedish oil technicians to Iran. The announcement expressed Sweden's regrets but gave no reason for the action.

Financial difficulties.—Another factor of apparent significance was the increasingly grave financial position of the Iranian Government. Anglo-Iranian has stopped advance royalty payments on which the government depends for a sizable part of its revenue. A resulting financial crisis is anticipated in the Iranian treasury.

Foreign-oil plan. — United States oil companies were reported in Washington to have virtually completed work on a foreign-supply plan which will go into effect in the event of another break in supplies from the Middle East like the one at Abadan in April. The plan is expected to go to the Justice Department in the near future for antitrust clearance.

The situation in regard to Iraq and Kuwait was not known in detail. Kuwait Oil Co., Ltd., and the Kuwait sheik's representatives were understood to be continuing negotiations on the company's general agreement for higher revenue.

In Baghdad, the Iraqi premier announced that the new agreement reached with Iraq Petroleum Co., Ltd., provided that Iraq would receive more than Saudi Arabia and not less than Iran. In these two countries, no final settlement is anticipated until events are finally resolved in Iran. Then the agreements reached will take into consideration any new arrangement worked out between the Iranians and the British.

Kuwait Sets Record

Kuwait Oil Co., Ltd., turned in a record-breaking production during the month of April. The company's daily average was 502,727 bbl. During March, Kuwait production was 375,380 bbl. daily.

April was the month in which labor trouble resulted in some loss of crude production in Iran along with the shutdown of about a week's duration of the Abadan refinery. The increase in Kuwait at least to some extent reflects this situation.

Iran's April production has not yet been officially announced. It is unofficially reported to have averaged 560,000 bbl. daily. Production in Iran during March was slightly above 700,000 bbl. daily. Most of the April loss of Iranian production was in products due to the refinery shutdown, which, in turn, forced cutbacks in the fields.

EUROPE

British Imports

Trend toward crude buying shown in refining upswing

THE current buildup of refining capacity in the United Kingdom with the resulting trend toward crude rather than products imports is reflected in data recently issued by the British Petroleum Information Bureau in London.

Last year, production of U. K. refineries showed an increase of some 66 per cent as a result of expansion work and completion of new units. Refinery production amounted to 9,283,752 tons (about 184,000 bbl. daily) in 1950 against 6,163,790 tons in 1949.

Of the 1950 production, 3,805,198

tons was fuel oil, 1,890,745 tons gas oil and diesel oil, and 1,477,955 tons motor and aviation fuel. The program of increasing British refining calls for reaching a capacity of some 20,000,000 tons by 1953.

From 1948 to 1950, the U. K.'s imports of crude oil increased from 1,174,000,000 gal. to 2,377,000,000 gal. (about 186,000 bbl. daily). During this period, fuel-oil imports dropped 60 per cent. However, despite the increased production of domestic refineries, imports of motor fuel during this same period rose slightly from 1,183,000,000 gal. to 1,221,000,000 gal. (about 95,600 bbl. daily).

The over-all increase in consumption of products in the United Kingdom in 1950 was about 10 per cent over the preceding year. Total consumption was reported at 15,267,771 tons (about 304,000 bbl. daily) against 13,839,727 tons in 1949. Of the major products, motor fuel sales were 5,195,173 tons against 4,671,395 tons in 1949; diesel oil for road vehicles, 1,034,103 tons against 924,350 tons; gas and diesel oil, 1,595,325 tons against 1,488,383 tons, and fuel oil, 3,092,691 tons against 2,795.229 tons.

The U. K. is now taking 25 per cent of its crude imports from Iran while 38 per cent is supplied by Kuwait, Bahrein, and Qatar. It depends on the Abadan refinery in Iran for nearly 50 per cent of its fuel oil, 20 per cent of the motor fuel, and more than 30 per cent of gasoline imports.

Germany Adds to Refining

Two small additions to the refining industry in Germany have been placed in operation.

One is the plant at Essen owned jointly by Kraftstoff - Handelsgesellschaft, mbH., and Kleinholz & Co. The equipment is now processing imported crude at a rate of about 36,000 tons a year (700 bbl. daily).

The operation will be expanded to a capacity of about 60,000 tons a year. Later this year, a thermal cracking unit and a tank farm are expected to be completed.

Another small refinery reported to have gone on stream is that built by Ruhrbau, GmbH., at Muelheim on Ruhr. Initial capacity is about 100,000 tons a year (2,000 bbl. daily), and future plans call for adding another 100,000 tons a year of capacity as well as cracking equipment.

Another project in Western Germany is the current reconstruction and expansion of war-damaged facilities in Ruhrchemie, AG., at Oberhausen-Holten. On completion, this plant is expected to have a capacity of about 5,000 bbl. daily with a cracking capacity of 2,000 bbl. daily. The operation is being built around existing distillation and cracking equipment, with a reformer to be added for improvement of the quality of the motor fuel produced. It is expected to go in operation the end of this year.

FAR EAST

Production Rising

Japan's crude output, up 85 per cent since 1948, now 5,660 bbl. daily; further increase expected this year

LARGELY as a result of the application of scientific exploration and drilling practices under American guidance, Japan has increased her crude-oil output 85 per cent since 1948 and is expected to show another 15-20 per cent gain during the current year.

Leo W. Stach, scientific consultant to the mining and geology division of the occupation headquarters in Tokyo, believes that the present healthy condition of the domestic producing industry will allow it to make a significant contribution toward reduction of Japan's foreign-exchange outlay for petroleum imports.

In a review of developments in the Japanese producing industry appearing in a recent weekly summary of the natural-resources section of the SCAP headquarters, Stach said a stable labor situation, increasing efficiency in drilling operations, and a sound financial situation resulting from 1949 operations contributed to the steady increase in production through 1950. The year's daily average of 5,660 bbl. was an increase of 51 per cent over 1949 and 85 per cent over 1948.

Continued development of the deep zones of Yabase field will bring further gains during this year. A fairly rapid rise in production is anticipated with the completion of a ring of highly productive development wells around the gas caps of the deeper zones, Stach said. A total of 18,417 bbl. of natural gasoline was produced in 1950, and this is expected to be approximately doubled this year as a result of the full operation of the new gasoline plant at Yabase.

About 97 per cent of Japanese production is by Imperial Oil Co., formerly a government-dominated enterprise but now only 23 per cent state owned.

Two Imperial petroleum engineers visited the United States last year, and on their return, new methods of rigging up, moving equipment, and preparing locations were introduced. Stach said the increase in footage drilled by Imperial, which was up 51.6 per cent over 1949 to a monthly average of 21,244 ft. in 1950, resulted both from improved practices and more rigs in operation.

Dual completions, Stach said, are particularly applicable in this deep Yabase zones, but the first attempts in this direction were not successful. Other efforts are being made. Considerable progress has been made in installation of a repressuring unit at Yabase which will use exhaust gas from the extraction plant.

Other developments included in the report:

Drilling results.—The Japanese oil companies in 1950 drilled 70 development wells of which 42 were produced, and 36 total exploration wells, of which 9 were produced. The percentage success rate of exploration drilling (outposts 58 per cent; new pool tests, 66 per cent; new field wildcats, 0 per cent) compares favorably with that, for example, of California (53, 30, 5 per cent, respectively), Stach said.

New reserves.—The most significant additions to reserves was the contribution of 8,539,300 bbl. at Yabase field, which resulted from extension drilling to determine the limits of the productive area of the deep reservoirs, Zones 8 and 9, discovered in 1949 and early in 1950. At the beginning of this year, Japan's proved crude reserves were 26,306,000 bbl., compared with 21,067,000 bbl. at the beginning of 1950 and despite production during the year of 2,066,000 bbl. There was a recalculation in several fields, lowering reserve estimates by 1,403,000 bbl.

Natural gas.—Production of natural gas during 1950 was 2,438,974,000 cu. ft., somewhat higher than for 1949. New production of gas was mostly from the Niigata gas field, and in Mobara field, Chiba Perfecture.

Exploration.—Exploration in terms of party months, showed an increase of 54 per cent over 1949. Much of this work, other than that conducted by the Imperial company, was directed toward finding gas. Exploration by all organizations, companies, Geological Survey, and universities, gave a total of 177.4 party months and 90 projects. Of this party-month total, 118.9 was in geological parties, of which 73.3 was by the Imperial company.

Legislative. — Study was continued during last year on the revision of the petroleum resources development law, which now is being expanded to include more detailed measures concerning conservation and to encourage the introduction of secondary recovery in Japan's older depleted fields by making provision for reimbursable financial aid.

Reconstruction

Japanese refinery adds new thermal cracking unit

TOA NENRYO KOGYO, Standard-Vacuum Oil Co. subsidiary in Japan, recently placed on stream a 3,500-bbl. thermal cracking unit at its Wakayama refinery as a part of a long-range reconstruction program for this plant and its other refinery at Shimizu.

The new unit was built largely out of prewar equipment which was assembled at the bomb-damaged Wakayama refinery. Postwar operations began at Wakayama in April 1950.

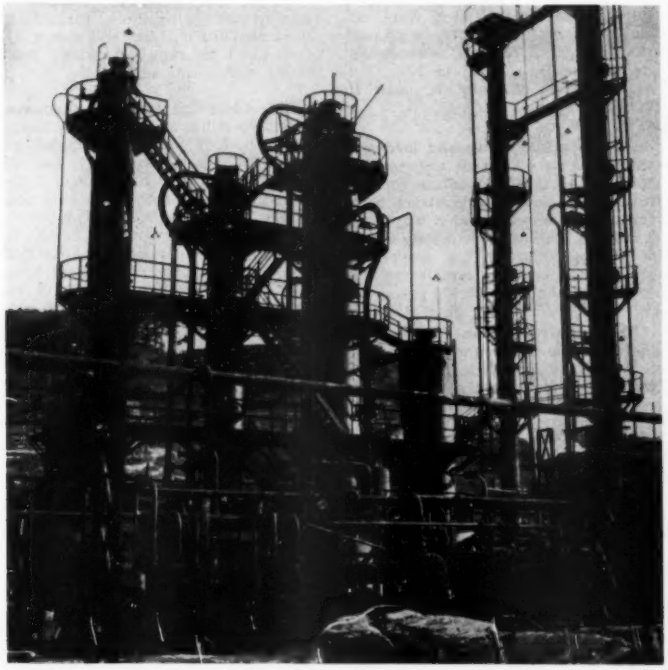
Since then, damaged towers, heat exchangers, pumps, and oil lines have been utilized to give the plant a two-stage atmospheric pipe still and wax-pressing facilities for the production of lubricants.

Present charging rate of 5,500 bbl. daily is based on current crude allocations, although the refinery is capable of running 10,000 bbl. daily.

In addition to the new thermal cracking unit, deasphalting and phenol-extraction facilities are planned for completion later this year to upgrade lubricant quality. Other facilities to raise lubricant production eventually to about 900 bbl. daily are now in the planning stage.

Shimizu, originally a lubricating-oil refinery, also has been revamped to increase its charging rate and to diversify its product range. Operations began in February 1950, and the Shimizu plant jumped quickly from 1,200 to 4,000 bbl. daily and currently is charging 5,000 bbl. daily on allocation. New equipment includes a 350-bbl. daily solvent dewaxing unit.

The two plants, which together employ some 1,300 workers, are supplying approximately one-fourth of all the petroleum products now being consumed by Japan.



NEW PLANT.—Shown here are the fractionating, light-ends recovery, and stabilization towers of the 3,500-bbl. daily thermal cracking unit which recently went on stream at the Wakayama refinery in Japan. Rehabilitation work at the refinery is being carried on with the technical and financial assistance of Standard-Vacuum Oil Co., which early in 1949 acquired a majority interest in Toa Nenryo Kogyo, operator of the Wakayama and Shimizu refineries.

LATIN AMERICA

Venezuelan Upswing

More rigs operating, continued buildup in activity is expected, but nation keeps one eye on a possible slump

A MODERATE upswing in the trend of drilling activity in Venezuela has taken place over the last year. Number of rigs operating in April was approximately 10 per cent greater than in the same month of 1950.

The Venezuelan companies were running a total of 98 rigs in April. This was a decline of 2 from the previous month but an increase of 10 over April 1950. The 98 rigs in April also compare with 90 in November of last year.

Reports from Venezuela showed Creole Petroleum Corp. was operating 13 rigs in April, Mene Grande 25, and Shell 29; Richmond was using 2 rigs (one on a workover), Texas Petroleum 3, British Controlled Oilfields 1, Pantepec 1, Phillips 3, Sinclair 4 (two on workovers or cleanouts), Socony-Vacuum 6 (one on workover or cleanout), La Mercedes 6 (one on cleanout), and Venezuelan Atlantic 5.

A continued gradual rise in the number of operating rigs in Venezuela is anticipated. The country is now considered to be producing close to its maximum rate, and no large expansion in output would be possible without stepped-up drilling activity.

Venezuela presumably would be relied on to provide a part of the additional reserve producing capacity currently being studied in the United States as a defense measure. This also would call for increased drilling and exploration, even aside from the presently heavy demand for Venezuelan crude.

Against these considerations is the desire of leaders of the Venezuelan oil industry to avoid any sudden and large increase in activity which might later be followed by a disruptive slump. This is particularly undesirable in a country whose economy is tied so closely to petroleum. The industry dropped back sharply in 1949 with a resulting serious labor problem.

Creole's plans.—This aim of an orderly, normal expansion was echoed in the remarks made by A. T. Proudfit, Creole president, at the recent stockholders meeting in New York. He pointed out that the company's transportation and refining facilities have been able to handle the increased production but that "any further increase in our activities will tax the handling capacity of our facilities."

Proudfit said Creole had decided

to add 1,200,000 bbl. of tankage to protect well-head operations against daily demand fluctuations. "It is costly to open wells and shut them in direct response to demand," he said. "We believe increased storage capacity will minimize this necessity. The end result should be greater stability at the well head and, we sincerely hope, greater stability of employment."

The Creole president said the company's drilling will be considerably enlarged this year. Creole plans 143 wells in proved fields this year against 96 field wells in 1950. A total of 84 exploration wells are programed, 31 more than last year. As a result, the company's capital expenditures will rise to an estimated $61,000,000 from the $43,300,000 spent in 1950. Proudfit pointed out the company's ability to obtain materials would influence its expenditures.

Duty absorption. — It will be necessary, Proudfit continued, for Creole to absorb the additional 10½-cent duty which will be imposed on Venezuelan imports into the United States when its share of the lower-duty quota is exhausted in June.

"The Venezuelan Government is naturally not satisfied with this situation since reduced oil realization also will affect its income," he said. "It has initiated discussions looking to a new trade treaty with the United States. Creole hopes for an early settlement of the negotiations with the Venezuelan Government for a new royalty-price formula. These have been prolonged, Proudfit said, because this is strictly a "technical development."

Fertilizer Plant Operating

An ammonium sulfate plant using natural gas and sulfur from Poza Rica field has been opened near Mexico City by a government-backed private company.

The plant, first of its kind in Latin America, will produce an estimated 63,000 tons annually and thus meet about one-seventh of Mexico's needs for nitrogen fertilizer. The site is at Cuautitlan, 20 miles from Mexico City.

The operating company is Guanos y Fertilizantes de Mexico, in which the Mexican Government through a financing agency holds stock. An additional credit for the operation was given by the U. S. Export - Import Bank. Total cost of the plant was about $10,000,000.

Natural gas for the project is received through the pipe line from Poza Rica to the Mexican capital. The plant will use about 4,000,000 cu. ft. daily. Sulfur requirements are figured at 65 tons daily, nearly half the present reported capacity of the sulfur-extraction plant which began operations recently at Poza Rica.

Tetuan Wildcat Finds Oil

Texas Petroleum Co. has made another discovery in the Tetuan block of the Upper Magdalena Valley of Colombia with its 1 Ortega.

The well is located about 10 miles north of the No. 1 test in the Tetuan area which was brought in in February 1950. Ortega tested for between 200 and 300 bbl. daily of 29°-plus gravity crude, from a depth of about 5,800 ft. Heavier 23°-gravity oil was obtained in the original Tetuan discovery.

Texaco has two rigs in the area and is using its crew alternately. The company has rigged up for 4 Tetuan. The Ortega well is on a separate structure.

The company is continuing its development of Velasquez field and recently completed No. 12 in this area. It has obtained a permit for a 37-mile pipe line which will carry the Velasquez crude to the Magdalena River port of La Dorado where Esso Colombiana is building a small topping plant.

Creole to Erect Building

Construction of a new 10-story office building for Creole Petroleum Corp. in Caracas, Venezuela, is expected to begin the latter part of the summer.

The new building to be completed in about 2 years, will be the main headquarters for the company. Construction contract of $8,000,000 has been awarded to George F. Driscoll Co. of New York and Caracas. Lathrop Douglas, New York, is the architect.

The structure, which will be known as the Esso Building, will be the largest office building in Venezuela.

International Briefs

A group of Mexican oil men incorporated as Cia. Mercantil del Norte is seeking financial support in the United States for drilling operations in Tampico and Vera Cruz. The group claims to have confirmed concessions on 1,500,000 acres which were officially recognized as private property prior to 1938. Several independents in the Southwest and in New York are reported planning to back the venture.

Petroleos Mexicanos and leaders of the Mexican oil union are expected to reach final agreement in the near future on a new labor contract. Negotiations have been under way about 3 months. The union is asking 84,000,000 pesos additional in wages and social improvements and is expected to receive about 50,000,000 pesos.

The import program drawn up by the Japanese Government's Economic Stabilization Board for the current fiscal year includes 17,950,000 bbl. of crude oil. This amounts to about 49,000 bbl. daily and is in line with the increasing capacity of Japan's Pacific Coast refineries, which went back in operation early last year. Besides these imports of crude, Japan's oil supply also includes about 6,000 bbl. daily of indigenous production, as well as some products imports.

The largest tanker built in Italy, the 17,000-ton Volere, is scheduled to leave Genoa soon on a maiden voyage to the Persian Gulf under 5-year charter to the Shell company of France. The vessel, which on trials averaged 18 knots, has a total carrying capacity of 34,500 tons (about 240,000 bbl.).

The Pakistan Government is understood to be considering the investment of some 30 million rupees (about $9,000,000) in the oil industry, according to a report from Karachi. This has resulted from the failure of private investors in Pakistan to take up to 30 per cent of the shares offered by foreign oil companies (principally Burmah Oil Co., Ltd., and Assam Oil Co., Ltd.) as required under Pakistan's petroleum regulations.

Mitsubishi Oil Co. has announced in Tokyo it has resumed its economic tie with Tide Water Associated Oil Co. The Japanese company said the American company had agreed to give financial and technical assistance amounting to $1,690,000. Tide Water will provide low-interest loans for the expansion of refinery production, assist with imports of crude and products from the United States, and furnish technical and practical information on operations and sales. At the recent annual meeting in New York, Tide Water's president, W. F. Humphrey, explained that his company is participating in the Mitsubishi operation on a 50 per cent basis.

A total of 167 oil drilling rigs of all kinds were reported running in Western Germany as of March. During January the German industry drilled a total of 30,057 m. (about 100,000 ft.). Of this, 10,814 m. was in exploration wells, 3,988 m. in extensions, and 15,255 m. in field wells.

When the expansion of storage capacity now under way is completed by the end of this year, the port of Duisburg-Ruhrort will become the second largest oil transmission point in West Germany after Hamburg. Tankage capacity in the port is being increased to nearly 100,000 cu. m. (629,000 bbl.), against 61,000 cu. m. at present.

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PERSONALS

Operations Chief

Roustabout to manager is background of K. Vaughn

KENNETH C. VAUGHN, manager of field operations for the Pacific Coast division of Union Oil Co. of California, Los Angeles, step by step has moved up the organization ladder since he joined the company in 1933 as a roustabout at Santa Fe Springs.

Born in 1909 in Potter Valley, Calif., Vaughn received his technical education at the University of Southern California. He entered the oil industry by working in the pipe-line and drilling departments of Standard Oil Co. of California. He later worked in the production department of George F. Getty, Inc., before joining Union.

From 1934 to 1936 he served as a well puller, pumper, and head well puller for Union at Dominguez. He was made assistant production foreman at Orcutt in 1936, at Santa Fe Springs in 1938, at Montebello in 1939. In 1940 he was appointed maintenance foreman, southern division; in 1941, production foreman, Dominguez; and in 1943, district production foreman, Dominguez.

KENNETH C. VAUGHN

In 1944 Vaughn moved to Bakersfield to become production superintendent of the valley division. In 1947 he was made production superintendent of the southern division and in February 1950 was promoted to superintendent of valley division. He was appointed to his present position in October 1950.

G. C. Macaulay, assistant district manager for Standard Oil Co. of California at Portland, Ore., has been promoted to district manager at Bakersfield, Calif. He will be succeeded in Portland by **C. G. Wood,** of the San Francisco office.

INDIANA STANDARD'S TECHNICAL MEN.—Shown here are 141 of the top technical men of Standard Oil Co. (Ind.) as they gathered at French Lick Springs, Ind., for the company's ninth joint technical meeting. Methods of meeting the national defense program's demands for critical petroleum products provided the principal discussion topics. Particular consideration was given to high-octane gasoline, jet fuels, heavy-duty motor oils, benzene, petrochemicals, and methods of increasing crude-oil supply. A total of 79 papers was presented at the week-long meeting.

In the following paragraphs identifying those in the photograph, "S" sands for Standard Oil Co. (Ind.), "SOG" Standlind Oil & Gas Co., "SPL" Service Pipe Line Co., "PA" Pan American Petroleum & Transport Co., "PAS" Pan-Am Southern Corp., "U" Utah Oil Refining Co., "I" Indoil Chemical Co., and "C" Consultant.

In the front row, left to right, are J. O. Howe (S), Pike H. Sullivan (S), G. T. Wilson (S), R. E. Vogel (S), J. E. Seebold (S), C. L. Parris (PAS), C. W. Peters (PAS), G. E. Schmitkons (S), Robert E. Wilson (S), J. K. Roberts (S), R. C. Gunness (S), J. E. Kasch (PA), A. L. Conn (S), H. R. Taliaferro (S), O. W. Collier (PA), F. H. MacLaren (S), R. L. Yahnke (S), R. F. Gasvoda (S), and G. W. Ritter (S).

Second row: Norman Sauter (S), W. H. Bahlke (S), J. W. Gaynor (S), J. B. Duckworth (S), W. G. Whitman (C), of Massachusetts Institute of Technology, H. C. Brown (C), Purdue University, J. C. Ducommun (S), F. Cushing Smith (S), R. T. Colquette (PAS), R. O. McKinley (S), H. M. Steininger (S), T. A. Abbott (S), M. T. Carpenter (S), A. B. Blake (S), R. V. Shankland (S), R. A. Steel

PERSONALS

Julian C. Ashby, party chief for Atlantic Refining Co. at Bunkie, La., has been transferred to Baton Rouge, La.

Patrick Daugherty, geologist for McCarty & Coleman, has been transferred from Wichita Falls, Tex., to Denver.

John S. Bradley, geologist for Humble Oil & Refining Co., has been transferred from New York City to Houston.

Albert H. Melsheimer, district geologist at San Antonio for Union Sulphur & Oil Corp., has been transferred to Houston to supervise three district offices in Texas.

Burr M. Roberts, senior geologist in charge of Bishop Oil Co.'s operations in Alberta Province, Canada, has been transferred to the United States to carry out new exploratory assignments. **R. Ross Anderson** has been appointed assistant manager of the Canadian branch office in Calgary.

Bill Hudson has been transferred by The California Co. to Ardmore, Okla., as a geologist working under **S. L. Ross,** division exploration superintendent.

Frank L. Fournier, formerly research geologist and a member of the production committee of Imperial Oil, Ltd., has been elected vice president in charge of exploration and development for Calvan Consolidated Oil & Gas Co., Ltd.

J. R. Lyne, formerly with Transcontinental Gas Pipe Line Corp. at Corpus Christi, Tex., has joined Industrial Gas Supply Co. of Houston. He formerly served as deputy supervisor of the Corpus Christi office of the Texas Railroad Commission Oil and Gas Division.

C. O. Phillips, maintenance man in the Shreveport, La., district of United Gas Corp., has been transferred to the Beeville, Tex., district as junior chemist, and **R. H. Knighton,** assistant engineer in the Wichita Falls, Tex., district has been transferred to San Antonio in a similar capacity.

G. A. Morrish, production foreman for Union Sulphur & Oil Corp., has been transferred from Jennings, La., to Winters, Tex.

Owen Scott, Jr., geologist for Warren Oil Corp., at Midland, Tex., has resigned and joined **W. B. Osborn,** independent operator at San Antonio.

W. M. Chaddick, Jr., of Sun Oil Co., has been elected president of the Corpus Christi, Tex., Geological Society. Other officers include: **J. C. Meacham,** of Humble Oil & Refining Co., vice president; **R. N. Spencer,** Union Oil Co. of California, secretary;

(S), A. C. Hershey (S), J. H. Krause (S), J. W. Healy (S), Scott W. Walker (SOG), E. W. Thiele (S), H. B. Higgins (S), and M. C. Hopkins (PA).

Third row: R. N. Giles (S), J. H. Rushton (C), Illinois Institute of Technology, E. B. Tucker (S), T. H. Rogers (S), P. R. Schultz (SOG), G. W. Watts (S), C. F. Feuchter (PA), C. C. Campbell (S), K. L. Carter (S), P. J. Perille (S), E. L. d'Ouville (S), P. C. White (S), J. E. Kline (S), C. M. Loane (S), Hal M. Hart (S), Frank J. Smith (PA), Nathan Fragen (S), R. Mungen (SOG), William Kaplan (PA), B. H. Shoemaker (S), J. N. Roper (S), J. F. Vanecek (S), W. B. Littreal (U), E. J. Luetzelschwab (S), and M. D. Gjerde (S).

Fourth row: E. W. Adams (S), H. R. Garrison (PA), H. D. Radford (PA), Moses Gordon (S), A. L. Jackson (S), F. W. Scheineman (S), E. A. Metcalf (S), G. F. Ordeman (S), C. G. Kustner (S), D. B. Mapes (SOG), J. D. Eisler (SOG), H. J. Liehe (S), W. F. Meehan (S), L. G. Lewis (S), M. H. Arveson (I), H. A. Parker (S), R. B. Jacobs (S), A. W. Neeley (U), F. R. Clark (U), D. R. Isom (U), C. R. Harte (S), R. F. Marschner (S), and E. K. Brown (S).

Fifth row: W. R. Remalia (PAS), R. J. Hengstebeck (S), R. W. Watson (S), L. T. Wright (S), A. H. Fox (S), C. N. Sechrist (PA), F. L. Anderson (PA), R. J. Hafsten (S), L. E. Schaffer (S), E. D. McKeague (S), R. C. Mallett (S), W. M. Patterson (PA), W. R. Hertwig (S), G. T. Moore (S), E. E. Hurley (SPL), E. A. Slade (SPL), R. E. Karll (S), H. L. Hilleary (S), H. R. Boehmer (S), C. C. Buchler (S), W. M. Dudley (S), A. B. Brown (S), H. V. Knight (S), W. B. Plummer (I), L. E. Elkins (SOG), and A. H. Newberg (SPL).

Back row: R. H. Price (PA), L. W. Mixon (S), Curtis Smith (S), Howard R. Peterson (I), R. L. Baldner (SOG), E. L. Gordy (S), N. E. Lemmon (S), H. W. Skov (S), E. H. Harclerode (S), G. M. Webb (S), W. L. Rittschof (S), E. G. Spittswood (PA), P. L. Brandt (PA), R. J. Lee (PA), E. F. Smith (S), L. L. Smith (SOG), Donald B. Edwards (SOG), J. A. Ridgway (PA), L. T. Herget (PA), G. W. Moyer (PA), P. F. Hawley (SOG), C. C. Miller (S), B. M Cooke (S), and D. S. Warning (S).

PERSONALS

Murphy Walker, La Gloria Corp., treasurer; **C. C. Miller,** Renwar Oil Corp., and **Gordon Daugherty,** Southern Minerals Corp., counselors.

B. C. Adams, Jr., assistant to the executive vice president of Texas Gas Transmission Corp., has been elected vice president of the firm. He will continue as vice president of Louisiana Natural Gas Corp. and Texas Northern Gas Corp., gas-gathering subsidiaries of Texas Gas in the southwestern Gulf Coast area of Louisiana. Prior to joining Texas Gas in May 1950, Adams was, for 2 years, a vice president of Trunkline Gas Supply Co.

Lyman C. Dennis, Pure Oil Co., has been elected president of the North Texas Geological Society. **Philip Larson,** Cities Service Oil Co., was named vice president, and **Willis H. Alderman,** Stanolind Oil & Gas Co., was elected secretary-treasurer.

L. A. Wainwright has been elected president and director of Rycade Oil Corp. of Houston. **Thomas A. Bowles, Jr.,** has been elected vice president of the firm. Prior to joining Rycade in 1947, Wainwright was with Amerada Oil Co. for 20 years. Bowles was associated with Sohio Oil Co. for 7 years prior to joining Rycade.

William H. Farrand, general manager of the foreign producing department of The Texas Co., has been appointed director of the foreign production division of the Petroleum Administration for Defense.

E. R. Connor, assistant vice president of Columbia Engineering Corp., a subsidiary company of Columbia Gas System, Inc., has been elected vice president. **James S. Phillips,** director of purchasing, also becomes vice president, and **Charles H. Mann** becomes treasurer of Columbia Engineering and assistant treasurer of the parent company.

Bowan Thomas, chief petroleum engineer, and **R. R. McCarty,** assistant division superintendent in Southwest

R. R. McCARTY

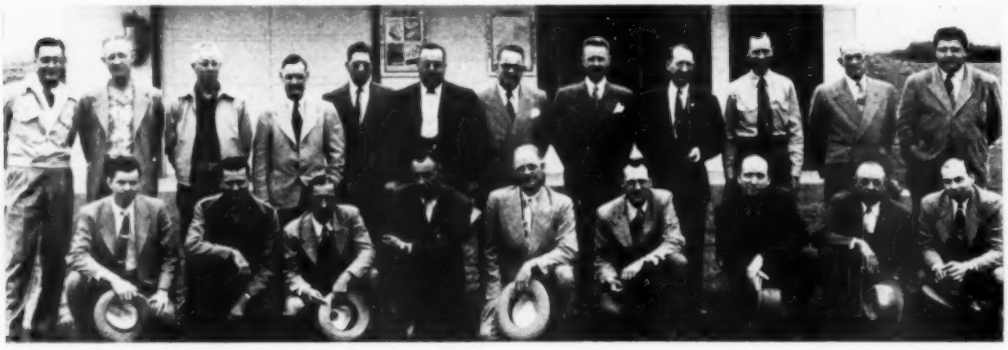
BOWAN THOMAS

Texas, have been appointed assistant managers of the production department of Humble Oil & Refining Co. These are newly created training positions and will be filled on a rotating basis on tours of 1 year each. Thomas will be in charge of all staff organizations, and McCarty will head drilling and producing operations. **Douglas Ragland** will become chief petroleum engineer as part of the training program.

R. L. Keyes, Louisiana division manager for The Texas Co., will be transferred from New Orleans to the general manager's office at Houston as assistant manager of the producing department, effective June 16. Keyes will be succeeded as Louisiana division manager by **J. H. Rambin, Jr.,** who is assistant division manager. **Harry X. Bay,** division geologist, will advance to assistant division manager, and **L. W. Calahan,** senior geologist steps up to division geologist.

Joe B. Miller, field-work supervisor for Magnolia Petroleum Co.'s natural-gas department, has been transferred from Premont, Tex., to Lake Charles, La.

W. C. Gussow, district geologist for Shell Oil Co., has been transferred to the Houston regional staff. Other changes include: **J. E. Lewis,** mechanical engineer, transferred from Corpus Christi to Kilgore, Tex.; **L. E. Sharpe,** division mechanical engineer, transferred from Tulsa to Corpus Christi; **H. C. Slider** exploitation engineer, transferred from Houston to Tulsa; **M. D. Thompson, Jr.,** exploitation engineer, transferred from Houston to Corpus Christi; and **W. J. Amis,** subsurface geologist, Houston, promoted to geologist.



SINCLAIR PRODUCTION MEETING.—Top production men of Sinclair Oil & Gas Co. are shown here during a field trip on the last day of the company's quarterly production meeting. The picture was made as the group visited Sinclair's "Donna Block," near Alamo, Tex., where the company dehydrates 30,000,000 cu. ft. of gas per day and produces about 350 bbl. of condensate in a unit operation. The meeting was held in Corpus Christi, Tex. Left to right, kneeling, are Connie L. Wilson, general staff engineer, Fort Worth; Floyd Brett, assistant general superintendent, Tulsa; W. J. Rogers, division engineer, Fort Worth; Jack H. Rankin, assistant division superintendent, Independence, Kans.; J. A. Jackman, assistant division superintendent, Casper, Wyo.; S. F. DeVore, division engineer, Casper; F. F. Wright, general staff engineer, Tulsa; C. S. Rose, division superintendent, Oklahoma City; and R. M. Kobdish, general staff engineer, Tulsa. Standing, left to right, are Joe Mefford, district foreman, Alamo; J. Dan Bryan, superintendent of stocks and materials, Tulsa; Raymond M. Carr, general staff engineer, Tulsa; Walter T. Crandall, division superintendent, Fort Worth; Lloyd Holsapple, general staff engineer, Fort Worth; R. A. Wright, division superintendent, Midland, Tex.; Truman C. Preston, assistant division superintendent, Natchez, Miss.; F. H. Rhees, general superintendent, Tulsa; D. M. Engle, division superintendent, Corpus Christi; G. L. Weger, division engineer, Corpus Christi; J. T. Reeves, division superintendent, Independence; and George H. Gray, division engineer, Midland.

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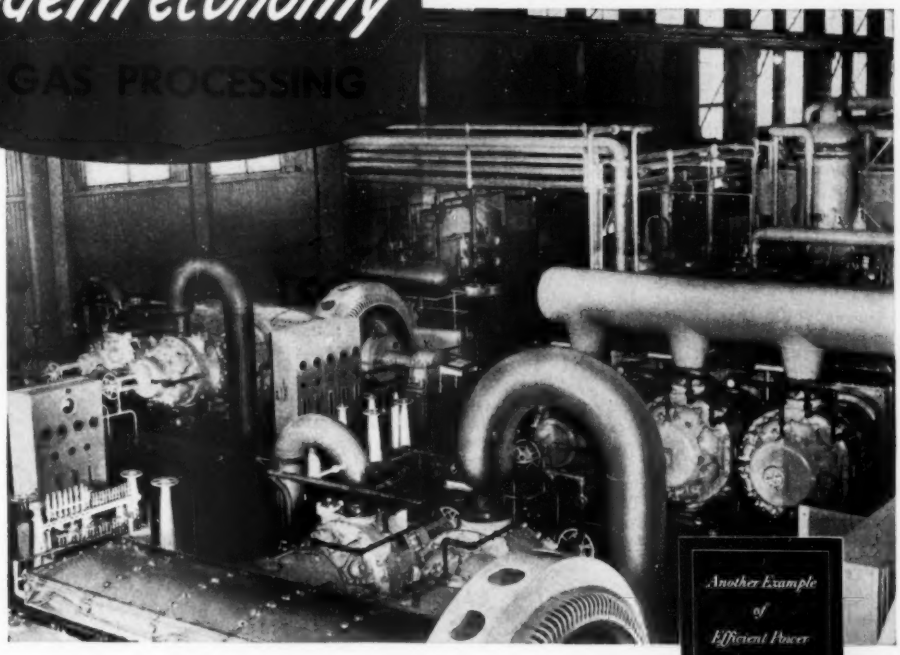

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PERSONALS

M. K. NEPTUNE

Millard K. Neptune, assistant director of production for the Petroleum Administration for Defense, was elected president of Platte Pipe Line Co. June 1. He succeeds **H. L. Phillips,** vice president and director of Sinclair Oil Corp. and president of Sinclair Oil & Gas Co., who has been acting as interim president of Platte since its inauguration August 29, 1950. Neptune joined Phillips Petroleum Co. in 1933 and after serving with the Petroleum Administration for War during World War II, he became assistant manager of Phillips' operations in Venezuela. In July 1948 he joined Continental Oil Co. as manager of the foreign department, and he served there until last February, when he joined PAD.

Clyde R. Burton, district foreman in the production department of Skelly Oil Co. at Kermit, Tex., has been transferred to Bristow, Okla., as traveling superintendent in the production department.

Raymond M. Peeler and **Glen D. Peeler,** independent operators, have moved their offices from Houston to Midland, Tex.

James R. Puckett has been promoted from district petroleum engineer of Magnolia Oil Co.'s Kermit, Tex., producing district to division petroleum engineer of the Kansas-Illinois-Kentucky division with headquarters at Wichita, Kans. He replaces **John R. Van Slyke,** who has resigned to enter business for himself. **H. K. Holland** has been promoted from assistant division petroleum engineer of the Gulf Coast division at Houston to division engineer of the Oklahoma division with headquarters at Oklahoma City. He replaces **Henry L. Waszkowski,** who has been made assistant superintendent of the Healdton, Okla., producing district. **Dee F. Pendley, Jr.,** has been promoted from a petroleum engineer of the Kermit district to district petroleum engineer of Magnolia's Electra, Tex., producing district. **Robert W. Lewis, Jr.,** has been promoted from district petroleum engineer of the Falfurrias, Tex., district to assistant division petroleum engineer of Magnolia's West Texas division with headquarters at Midland, Tex. **Robert C. Randle** has been promoted from a petroleum engineer of the Falfurrias district to district petroleum engineer in the same district. **Ollie J. Ford, Jr.,** district petroleum engineer of the Rusk producing district in East Texas, has been transferred to the same position in the Kermit producing district. **Joseph A. Morris** has been promoted from a petroleum engineer in the Alice district to district petroleum engineer of the Rusk producing district with headquarters at Kilgore, Tex.

R. C. Barbour, general superintendent of the production department of Humble Oil & Refining Co., has been appointed manager of the entire production department. He joined the firm 30 years ago as a lease pumper and was named West Texas division superintendent in 1934. He was transferred back to East Texas 2 years later as division superintendent, and in 1946 was transferred to Houston as general superintendent of the production department.

James E. Keenan, General Petroleum Corp.'s district geologist for western Wyoming and northwestern Colorado with headquarters at Craig, Colo., has been transferred to Billings, Mont. The district geologic and land office at Great Falls, Mont., also has been moved to Billings. This move involves **C. E. Carlson** and **C. T. Spalding,** geologists, and **Jack Swafford,** landman.

***HONORARY MEMBERSHIP.**—Roy F. Bennett, Sohio Petroleum Co., retiring president of the Houston Section of Society of Exploration Geophysicists, presents a plaque awarding life membership in SEG to Dr. E. E. Rosaire for his contributions to petroleum exploration. Rosaire, who was past president of the national society of SEG, organized Independent Exploration Co. at Houston, and was its president until 1937. The award was presented at a joint meeting held with the Houston Geological Society.*

W. P. Lawrence, party chief for Amerada Petroleum Corp., has been transferred from Childress to San Angelo, Tex.

Raymond M. Thompson, formerly with U. S. Geological Survey as geologist in charge of Wind River basin, Wyoming, has joined British American Oil Co. at Denver as exploration geologist.

Earle Johnson, General Geophysical Co., has been elected president of the Houston section of the Society of Exploration Geophysicists. Other officers elected include: **Eugene Frowe,** Robert H. Ray Co., first vice president, **J. E. McGee,** Gulf Oil Corp., second vice president; **C. R. Wallace,** The Texas Co., secretary; and **W. E. Steele,** Pure Oil Co., treasurer.

P. R. Tetrick, geologist at Mount Vernon, Ill., for Magnolia Petroleum Co., has been transferred to Bismarck, N. D., in the same capacity.

DEATHS

Robert Moore Garrett, 43, independent oil operator, died June 3 in Dallas. From 1933 to 1939 he worked as a geologist for Dilworth Hager in Dallas, and then became an independent operator.

Donald K. Weaver, production manager for Wilshire Oil Co., Los Angeles, was killed in an airplane crash near Casper, Wyo., January 18. His body was recently recovered from the crash scene.

George E. Riker, 46, mechanical engineer for Hydrocarbon Research, Inc., of New York, died May 28 of a heart attack.

J. H. Walker, 45, farm boss for Stanolind Oil & Gas Co., died May 26 in Woodsboro, Tex.

Peter P. Stalberger, 59, chief clerk in the warehouse of Humble Pipe Line Co., Houston, died May 29.

Edgar Leroy Corah, 72, died in San Antonio, Tex., recently. He was earlier associated with Cornplanter Refining Co. at Warren, Pa., and later with Empire Refineries in Oklahoma.

Earl Swift, 55, production superintendent for Grady Vaughn Oil Co. in Overton, Tex., died May 29 in Jacksonville, Tex.

Leonard A. Gibbs, 48, formerly with Standard Oil Co. (N. J.), died May 29 in Tulsa. He had been with the firm for 9 years.

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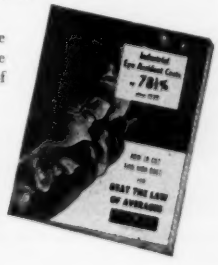

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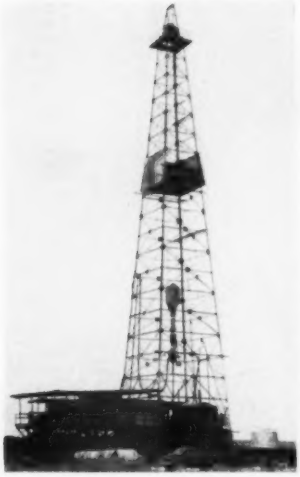
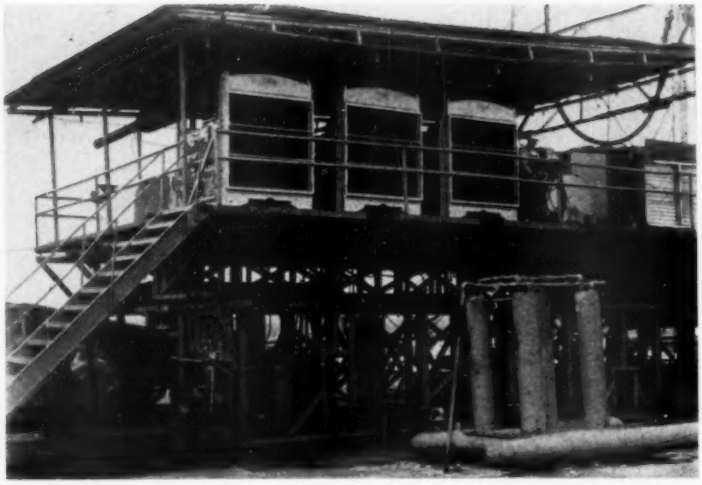




Left: Over-all view of rig. The underdrive permits close coupling of the pumps, so that the rig appears shorter than normal. Right: Three gas or butane engines are prime movers. Substructure is fabricated of welded tubular material, and can be telescoped up or down to fit derrick platform. Top transverse section is of fixed height.

NOBLE MODERNIZES 12 DRILLING RIGS

. . . Achieving flexible, up-to-date units at low investment cost

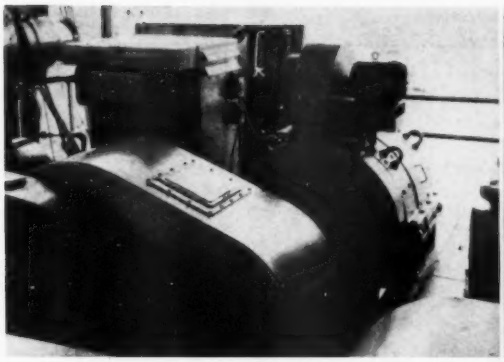
by Roy F. Carlson
West Texas District Editor

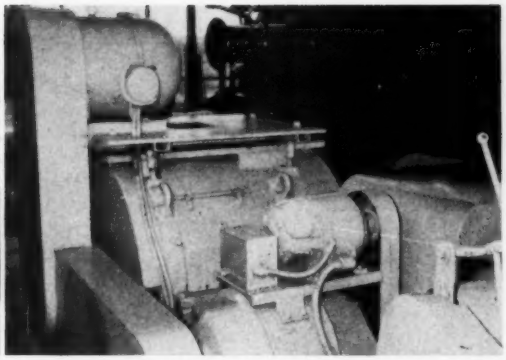
A RIG rebuilding program that began immediately after the end of World War II has now given Noble Drilling Co. 12 completely modernized and thoroughly up-to-date rigs. The equipment was converted from old steam-powered or alternating-current drilling units to rigs of the direct-current semielectric variety. In most cases new gas or butane-burning motors were purchased as prime movers, but generators and electric motors for the draw works were acquired from the Government as war surplus. The combination has resulted in very flexible, modern rigs with a relatively low total investment cost.

Noble normally buries mud pits on its locations. Three pits are shown here in L-shape, with other parts of the mud system in background.

The 12 modernized rigs are not identical, since different draw works and engines are used, and different numbers of engines are used as the rig requires. In principle, however, they are the same, with direct-current generation equipment being driven by reciprocating internal-combustion engines through a compound, and furnishing power to direct-current motors either on the draw works or turning the rotary table. Mud pumps are driven directly from the compound through V-belting and a chain-driven "underdrive"—this being the reason for the "semielectric" designation.

One of these modernized rigs, subject of the accompanying pictures, may be regarded as being typical of the revamped drilling units. The rig shown is operating in Yarbrough-Allen field, West Texas, drilling to depths of about 10,500 ft. to the Ellenburger lime. The unit has drilled to depths of 13,000 ft. with $3\frac{1}{2}$-in drill pipe, and probably could go to 15,000 ft.





Left: Direct-current machine driving the draw works is shown here at right. In foreground is a 3-to-1 reduction chain drive to draw works. Right: Generator and excitation equipment with contactor box and switchgear at right.

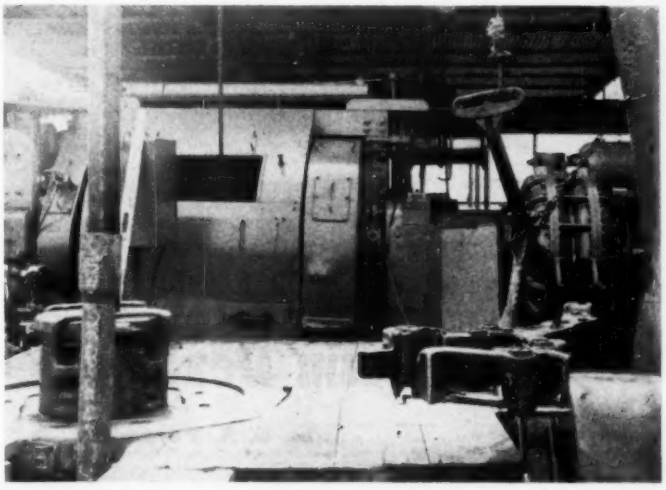
Engines and Compound

Prime movers on this rig are three gas or butane engines, each of which is rated at about 300 hp. at West Texas altitudes, a total of 900 hp. in all. Some of the lighter rigs use only two engines.

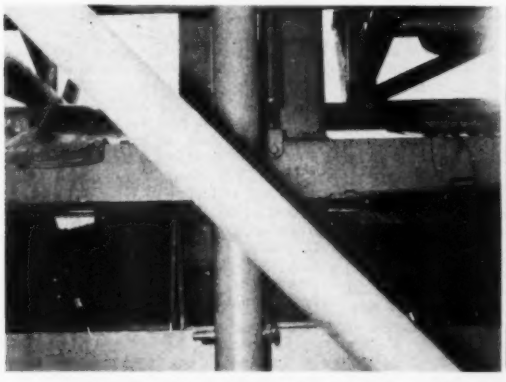
The three engines are connected to the compound through 24-in. air clutches. The compound itself is equipped with 36-in. air clutches, and is arranged so that any engine or combination of engines can drive any part of the mud pump-generator system. The compound is constructed according to Noble specifications either in the company's shops at Seminole, Okla., or in various field shops.

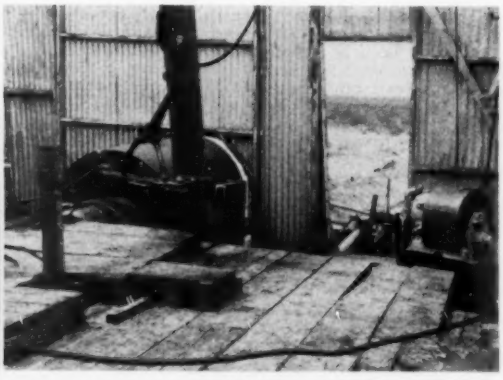
At the rear of the compound, two separate chain drives run downward into the engine substructure, and turn two mud-pump driving sheaves. The sheaves are fitted at their outboard ends with air clutches for connection and disconnection of either of the pumps. The pumps may be

(Continued on page 102)



Draw works as seen from V-door. A double 40-in. auxiliary brake is shown at right.





Left: View of underdrive pump drive from inside the engine substructure. Clutches are mounted on the outboard ends of the sheave shafts. Right: Air winch for light hoisting operations shown at right, diagonally across the driller's position. It spools a soft-laid wire line.

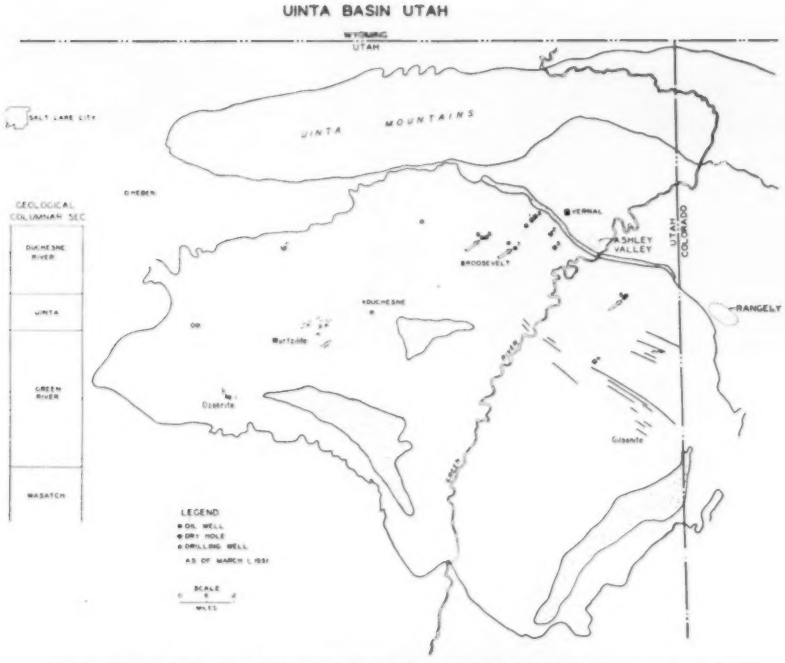


Fig. 1—Map of Uinta basin where exploration has recently developed into a major industry program. The basin embraces over 5 million acres.

PROGRESS REPORT:

Uinta Basin Development Activity

by E. A. Polumbus, Jr.*

The spectacular surface occurrences of hydrocarbons which are characteristic of this basin have long interested the industry

LESS than 2 years ago oil was first discovered in commercial quantities in the Tertiary sediments of the Uinta basin. Since that time a second field has been discovered and some 400,000 bbl. of oil produced from the basin.

These discoveries have focused considerable industry-wide attention upon this area. This article discusses some of the more significant and interesting aspects of the limited exploration and development to date, with emphasis on drilling-penetration characteristics.

Structurally the Uinta basin is elliptical in shape and embraces over 5 million acres (Fig. 1). The Uinta Mountains form the northern boundary; the Douglas Creek arch bounds the basin on the east; the west boundary is the Wasatch Mountains; and the southern is the Roan and Book Cliffs.

The Uinta basin is characterized by spectacular surface occurrences of hydrocarbons. The so-called oil sands of Asphalt Ridge and other similar features, together with the numerous veins of gilsonite, wurtzilite, and ozokerite have been estimated to contain several hundred million barrels of hydrocarbon material.

Commercial production of oil and gas has been obtained from pre-Tertiary formations along the margin of the Uinta basin at Ashley Valley, Rangely, and other fields. This discussion, however, will deal only with oil-bearing Tertiary formations.

The columnar section given in Fig. 1 shows the four principal Tertiary formations in the basin proper: Duchesne River, Uinta, Green River, and Wasatch, all of which are nonmarine. With the exception of the Green River, the Tertiary sediments consist of maroon or red variegated shales and marlstones with irregular sandstones and conglomerates. The Green River is commonly referred to as an oil shale, outcrops of which are being mined at the Bureau of Mines experimental oil-shale plant at Rifle, Colo. It consists of well-bedded oil shales and marlstones, thin dolomites, and limestones, and lesser amounts of bedded sandstones.

The surface occurrences of hydrocarbons in the basin have long been of interest to the oil industry; however, a popular conception that the nonmarine Tertiary sediments were not likely to yield commercial petro-

*Carter Oil Co., Denver. This paper, entitled "Progress of Development Activity, Uinta Basin, Utah," was presented at the spring meeting of the Rocky Mountain District of the American Petroleum Institute's Division of Production, Casper, Wyo.

leum retarded exploratory activity. Only some 20 wells were drilled prior to 1946, and these to shallow depths.

Initiated less than 5 years ago, the recent phase of exploration has developed into a major industry program, as evidenced by the geological, geophysical, and drilling activity currently carried on in the basin. Nine wells have been completed to depths varying from 5,270 to 9,392 ft. Of these nine wells, two were commercial oil discoveries, one a commercial producer offsetting a discovery well, and one a marginal discovery. As of March 1, 1951, there were five active drilling wells.

Discoveries

The first five wildcat tests in the present phase of exploratory activity had encouraging shows, although completed dry. The sixth wildcat test was a discovery near Roosevelt, Utah, in mid-1949, and dispelled past doubts that a high-pour-point, medium-gravity crude could be produced in sizable volumes. From a fractured Green River zone at 9,351-92 ft., the 1 Ute Tribal flowed 1,633 bbl. of 33° gravity and 90° F. pour-point oil in 24 hours with a gas-oil ratio of 350 cu. ft. per barrel.

The seventh wildcat well, located 7 miles southeast of the Roosevelt discovery, resulted in a 25-bbl. pumper (Gusher discovery) from the Green River formation at roughly the same stratigraphic position as the productive zone in the Roosevelt producer. The operator was sufficiently encouraged to commence another wildcat in the same vicinity, which was drilling as of March 1, 1951.

The sixth and seventh wildcats were the first wells drilled below 9,000 ft. and were primarily searching for fractures in tight, dolomitic shales for production.

The eighth wildcat, 35 miles southeast of the Roosevelt discovery, resulted in discovery of Red Wash pool. On an initial test, this discovery flowed at the rate of 275 bbl. of oil per day through ¼-in. choke with a gas-oil ratio estimated in the order of 1,500-2,000 cu. ft. per barrel, producing from a zone of alternating sands and shales at a depth of about 5,200 ft.

Roosevelt field. the first Tertiary discovery in the Uinta basin, had produced 350,000 bbl. of oil to March 1, 1951. As shown by Fig. 1 it is located approximately 20 miles southwest of Vernal and 9 miles northeast of Roosevelt, Utah. Since only two producers have been completed, the field has not been defined. The pool is unlike most reservoirs in that thus far the recoverable oil is dependent entirely upon fractures.

Fig. 2 shows geological columnar sections of the two producing wells. The top of the Green River was encountered at 5,765 ft. and 5,787 ft. in the two wells and was penetrated in both wells to total depths of 9,392 ft. From approximately 6,700 ft. to total depth the Green River is almost entirely carbonaceous shale. Within this massive oil shale there are thin beds of dense dolomite and dolomitic, quartzitic siltstones. Numerous fractures are encountered throughout the Green River formation. It is in the more or less open, partially calcite-filled, intercommunicative fractures that oil is being produced in Roosevelt pool at the present time.

Fig. 2—Geological columnar sections, Roosevelt pool, Utah.

Casing was set at 9,351 ft. in 1 Ute Tribal, and after acid treatment, the well was completed for the previously mentioned initial flowing potential. Fractures are apparently not as open and permeable in the 2 Ute Tribal as in the first well inasmuch as the former was completed in August 1950 for an initial flowing potential of only 439 bbl. of oil per 24 hours after acidization.

Value of surveys.—Most of the commonly used logging devices have

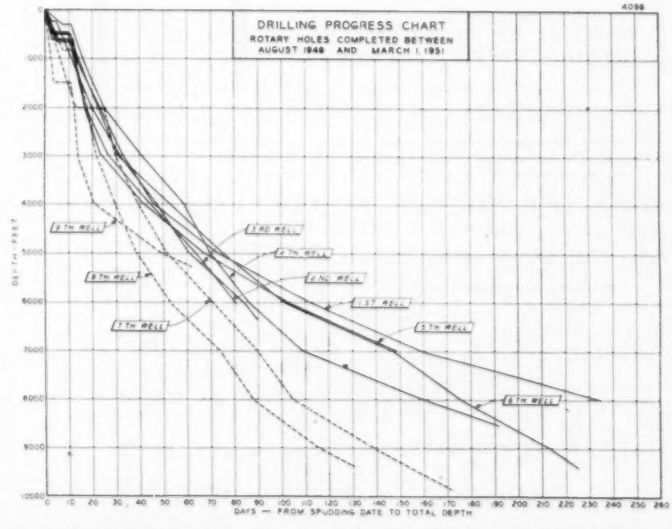

DRILLING PROGRESS CHART
ROTARY HOLES COMPLETED BETWEEN AUGUST 1949 AND MARCH 1 1951
DEPTH - FEET
DAYS — FROM SPUDDING DATE TO TOTAL DEPTH

Fig. 3—Plot of cumulative days versus depth for individual wells completed prior to March 1, 1951. Wells numbered according to chronological order of completion.

been run at Roosevelt consisting of electric surveys, radioactive logs, caliper surveys, and temperature surveys. Electric and radioactive logs have been of little value thus far; however, as experience is gained the radioactive and electric-logging methods may prove to be more useful. In the first well the caliper survey shows hole enlargement opposite major oil zones, a correlation which may prove useful in future development. The temperature survey has given some indication of becoming a useful correlative tool. In the two wells drilled to date abrupt changes in temperature gradients have been noted which may correlate with recoverable oil content.

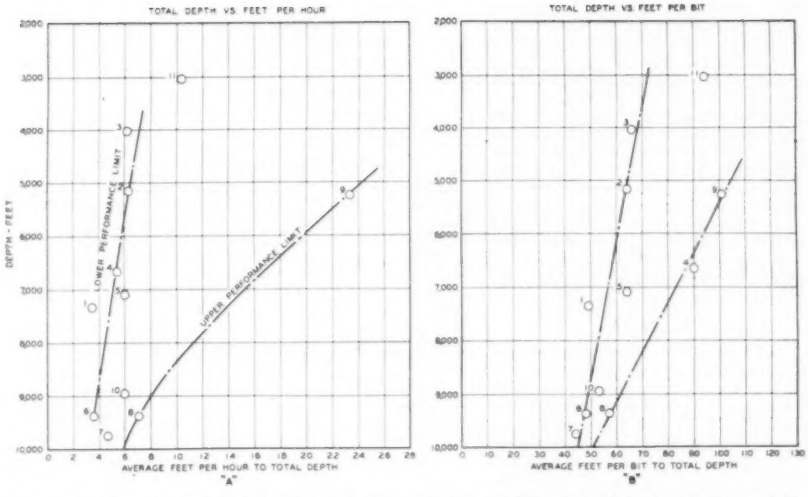

TOTAL DEPTH VS. FEET PER HOUR
DEPTH - FEET
LOWER PERFORMANCE LIMIT
UPPER PERFORMANCE LIMIT
AVERAGE FEET PER HOUR TO TOTAL DEPTH
"A"
TOTAL DEPTH VS. FEET PER BIT
AVERAGE FEET PER BIT TO TOTAL DEPTH
"B"

Fig. 4—Correlation of total depth with average feet per hour and feet per bit to total depth, using 9-in. rock bits.

Drilling Operations

From August 1946 when the present phase of exploration activity began, to February 1, 1951, a total of 94,600 ft. of Tertiary sediments was penetrated with rotary tools in nine completed and five drilling wells. A composite total of 1,995 days was required from spudding date to total depth for an average drilling progress of 47 ft. per day.

Fig. 3 is a plot of cumulative days versus depth for individual wells completed prior to March 1, 1951. The wells are numbered according to the chronological order of completion. Average depth of completions to date is 7,800 ft.

The most important observation to be made from this chart is the general improvement evidenced by shifting of the curves to the left as experience was gained. For example, to a depth of 6,000 ft., 112 days were required for the first well as compared with 51 days for the latest well completed. A number of variable

TABLE 1—COMPOSITE RIG TIME ANALYSIS FOR 94,600 FT. OF TERTIARY SEDIMENTS PENETRATED

	Estimated per cent
On bottom—drilling	35
Coring	6
Reaming	9
Trips	15
Surface casing	10
Down time	3
Testing (drill stem)	8
Other (surveys, connections, circ for samples, conditioning mud, lost circulation and fishing	14
	100
Total (from spudding date to TD) Days	1,995
Avg. days per well—running pipe, testing, etc., after reaching TD, days	49

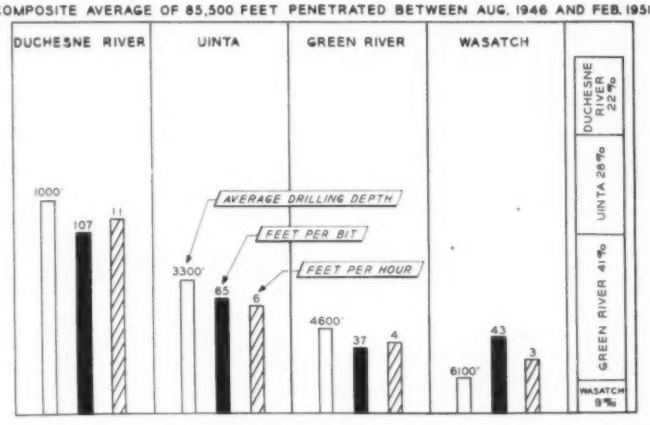


Fig. 5—Average penetration characteristics of 9 in. rock bits to date for each of the four formations.

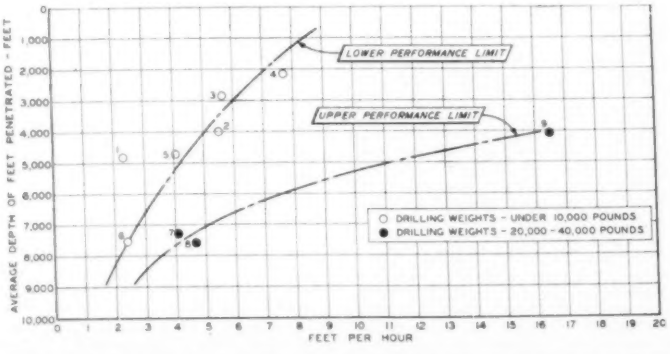

AVERAGE DEPTH OF FEET PENETRATED - FEET
LOWER PERFORMANCE LIMIT
UPPER PERFORMANCE LIMIT
DRILLING WEIGHTS - UNDER 10,000 POUNDS
DRILLING WEIGHTS - 20,000 - 40,000 POUNDS
FEET PER HOUR

Fig. 6—Plot of average depth of Green River formation penetrated versus feet per hour, using 9-in. rock bits.

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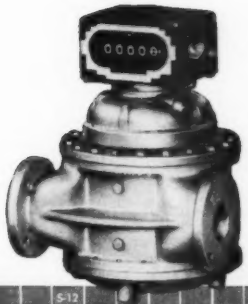

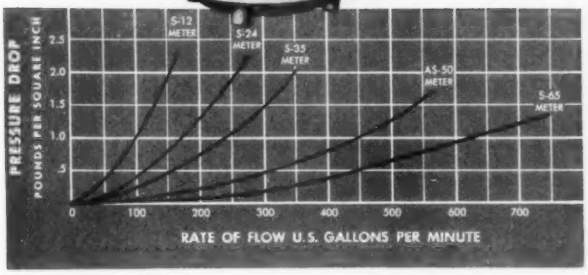

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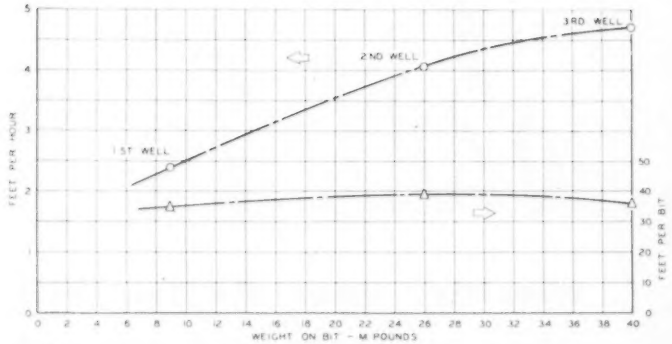

Fig. 7—Effect of drilling weight on performance of 9-in. rock bits in Green River formation at approximate average depth of 7,500 ft., and average rotary r.p.m. of 60-80.

factors are involved in this relationship; however, it is known that an appreciable amount of the improvement reflected on this chart is attributable to improvement in drilling technique.

Table 1 illustrates the extent to which various time factors have affected the drilling progress rate to date. The 1,995 days required from spudding date to total depth have been broken down into the more significant time factors required for penetrating the 94,600 ft. of Tertiary sediments. "On bottom" time for drilling and coring amounted to 41 per cent of the total time. Reaming time accounted for 9 per cent. Running surface casing accounted for 10 per cent. Trip time amounted to 15 per cent of the total time.

Testing, which includes time for drill-stem testing only and does not include production tests after pipe is set, accounts for 8 per cent. Time required for running pipe and testing after reaching total depth averaged 49 days per well for the nine wells completed prior to February 1. This is unusually high due to the concerted effort made properly to evaluate numerous oil shows. Oil strings were run in seven of the nine completed wells.

Penetration

The importance of on-bottom time for making new hole, which has accounted to date for 41 per cent of the total time, justifies giving this item special emphasis. The over-all penetration rate with 9-in. rock bits averaged 5 ft. per hour with an average bit performance of 50 ft. per bit. Of the 94,600 ft. penetrated, 9,100 ft., or 10 per cent, was cored. Only 7 per cent, however, was cored for geological information—the remaining 3 per cent having been cored because in certain sections diamond coring was more economical than conventional drilling.

Feet per hour and per bit.—Fig. 4 correlates total depth with the average feet per hour and feet per bit to total depth and illustrates the over-all performance to date of 9-in. rock bits. Referring first to the relationship between total depth and feet per hour (Fig 4A), the points plotted on the graph represent the over-all penetration rate to total depth for individual wells. The points have been numbered in the chronological well completion order.

Two curves have been drawn, one representing a lower limit of penetration performance and the other an upper limit. Here, as in Fig. 3, the lower limit curve averages the penetration performance of the earlier wells completed and the upper performance limit curve represents the latest wells completed. Unfortunately there have been insufficient wells drilled to date to ascertain the extent to which geographic position of the wells with respect to rock characteristics affects penetration rates. One well, well 9, the latest well drilled, is geographically nearest wells 4 and 5; however, it is 18 miles distant from these wells.

One observation which should be made here and will be emphasized later in the discussion is that the wells averaged by the upper performance limit curve, which are the latest wells completed, carried drilling weights on the bits of 20,000-40,000 lb., while the points averaged by the lower limit curve represent drilling with under 10,000 lb. weight.

Another observation which should be made is that well 9, which has had by far the fastest penetration rate to date, was drilled with rotary speeds of 120 to 160 r.p.m. while all other wells represented on the chart were drilled with average rotary speeds varying from 60 to 100 r.p.m. It is not intended to imply that the higher rotary speeds would effect as desirable penetration rates in the other wells as it apparently did in well 9, since only one well has been drilled with this average speed and since the area in which it was drilled may reflect local conditions.

Referring next to Fig. 4-B, the relationship between the over-all average feet per bit and total depth, two curves have been drawn to represent upper and lower performance limit of bit use. To date, bit consumption has averaged one bit to 50 ft.

By formations.—In the foregoing discussion of penetration characteristics no distinction has been made as to the various formations in the Tertiary section in the Uinta basin. Fig. 5 shows average penetration characteristics of 9-in. rock bits to date for each of the four formations. Some liberties were taken in differentiating between formations, particularly in the four wells drilled along the Asphalt Ridge, where the sediments have no clear lines of demarcation.

A total of 85,500 ft. of Tertiary sediments, consisting of 22 per cent Duchesne River, 28 per cent Uinta, 41 per cent Green River, and 9 per cent Wasatch, is represented in the average penetration characteristics by formations.

One general observation can be made from this chart. There is a uniform decline in both the feet per bit and feet per hour with depth, with the decline being roughly 20 per cent per thousand feet. Depth appears to exert more influence on penetration than variation in geologic age. It should be kept in mind that these data are averages of considerable thicknesses in sediments and that individual wells will vary appreciably from these averages as was observed in the previous figure.

The Green River formation in the Uinta basin justifies special consideration in that to date approximately 40 per cent of the Tertiary sediments penetrated are Green River type sediments. Fig. 6 is a plot of average depth of Green River formation penetrated versus feet per hour. The points on the chart reflect average penetration in the nine completed wells used on previous charts. Here again, two curves have been drawn to reflect lower and upper performance limit. The upper performance limit line averages wells drilled with drilling weights in the order of 20,000-40,000 lb., while the lower performance limit represents drilling weights under 10,000 lb.

Attention is directed to the variation in penetration rate for the 7,500-ft. average depth. The three wells represented by these points are located within 7 miles of one another and, therefore, would be expected to have similar drilling characteristics. By increasing drilling weights, however, penetration was increased approximately 100 per cent.

Drilling weight.—In order more closely to examine the effect of drilling weight in this particular area, the three points have been replotted on a more sensitive scale, Fig. 7, with feet per hour versus weight on bit inasmuch as they are all at comparable depths. In the first well, only 9,000 lb. was carried on the bit and the penetration rate averaged only 2.4 ft. per hour. An average of 26,000 lb. weight

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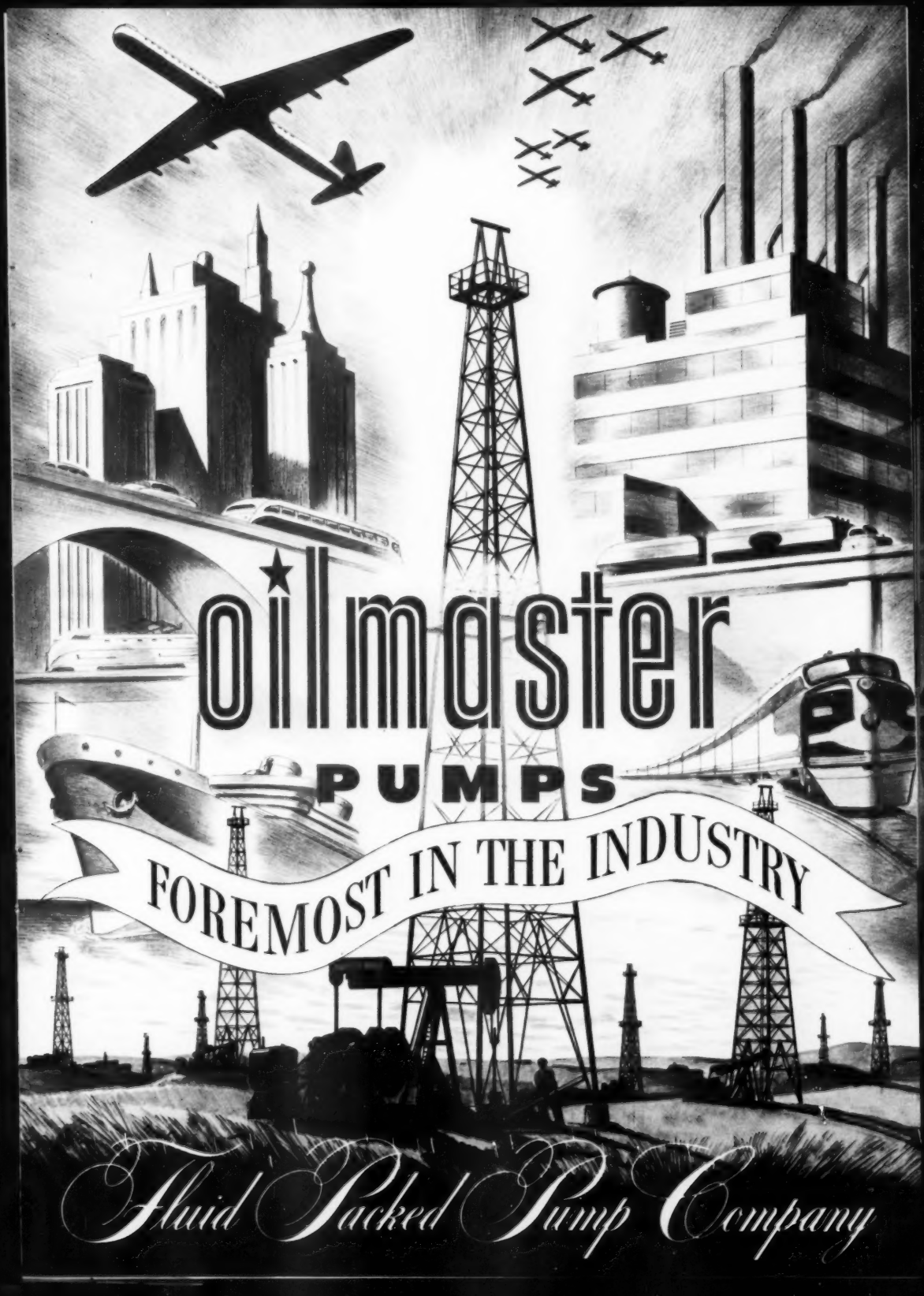
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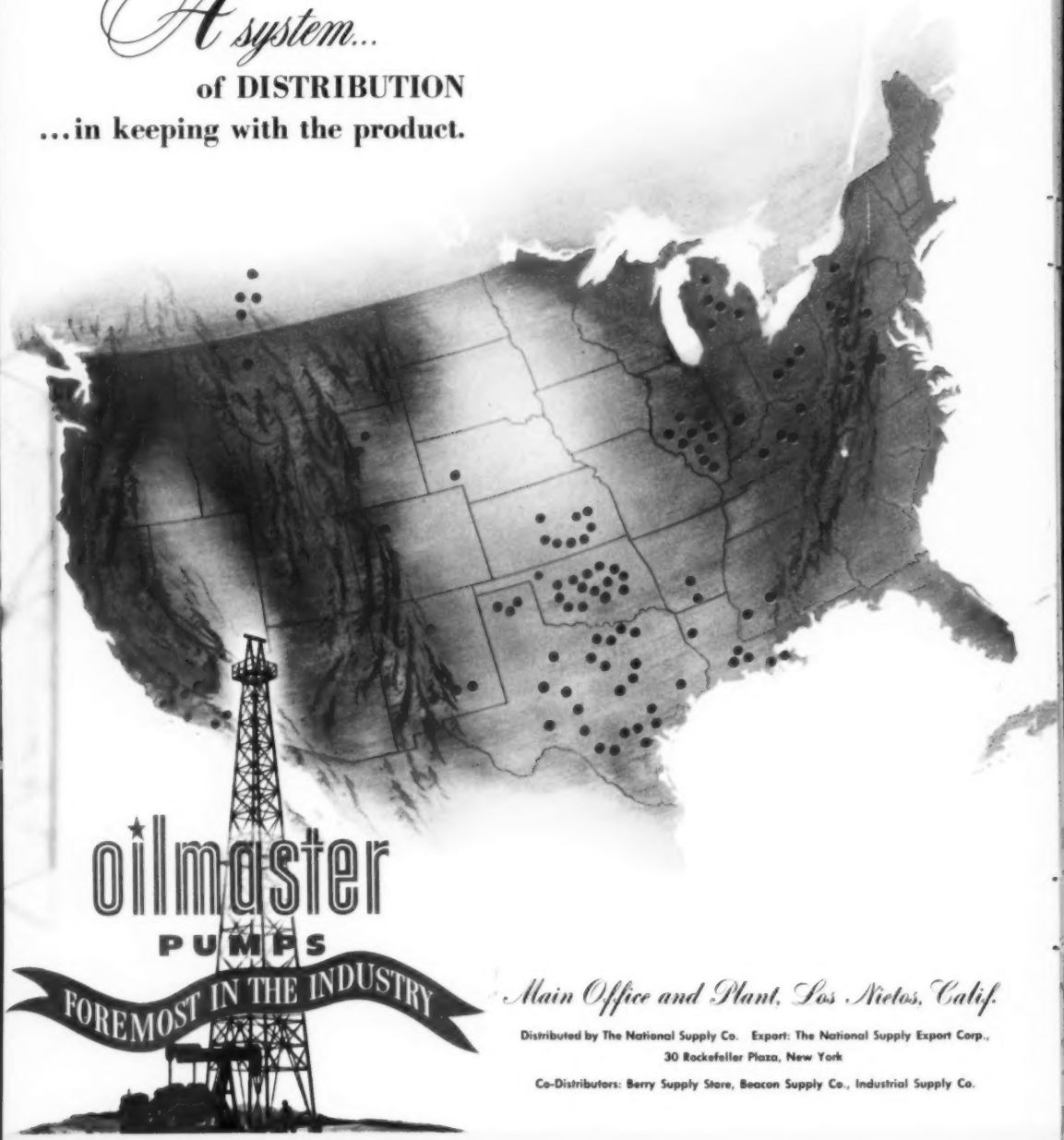

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CATHODIC protection functions by maintaining at the surface of the threatened metal a continuous supply of negative electricity to neutralize any and all positive ions which reach the surface. If and when this is done, the atoms of metal which comprise the surface cannot obtain positive charges from the solution, and thus cannot become ions. If they cannot become ions, they cannot dissolve; hence, there can be no corrosion.

In any given case, a question of primary importance is how much current will be required to maintain this continuous negative charge. Many factors enter into this problem—the nature of the metal being protected, the kind and amount of ions in the corroding solution or soil, the relative motion of metal and solution, and—most important—the nature of the reaction at the surface. The coating affects the apparent current requirement, because it affects the actual area of metal exposed to corrosion, and subject to cathodic protection.

The primary source of positive charges which can convert metal atoms into ions and thus cause a metal surface to corrode is the hydrogen ions in the solution. Wherever there is water present, it is to some degree ionized, and thus there are always hydrogen ions to initiate corrosion. When cathodic protection is on duty, maintaining a negative charge at the cathode surface, these hydrogen ions will be neutralized as fast as they reach the surface. There will be a tendency for them to form a film on the surface, and what happens to this film has a very important bearing on the success of the cathodic protection and on the amount of current necessary to maintain it.

Film Forms Readily

Under the most favorable conditions, the film forms readily and remains continuously; current requirements are extremely low. Under the worst conditions, free oxygen and high velocities remove the film as fast as it can be formed, and current requirements are at a maximum. Between these extremes fall the cases encountered in actual practice.

Pipe lines in soil—with very little variation with respect to different soils—require from 1 to 2 ma. per sq. ft. of exposed surface. In order to obtain this current density everywhere, it is often necessary to supply a higher average current density, since absolutely uniform current distribution cannot be had. Coated pipe may be anywhere from 0.5 per cent bare to as high as 50 per cent bare; this is one of the most difficult quantities to estimate without field tests. If the coating is known to be good, has been properly and conscientiously applied by a reputable organization, and is not too old, an estimate based on 2 per cent bare and 2 ma. per sq. ft. is a reasonable basis upon which to proceed. Such an estimate must always be considered as tentative, however, and subject to modification in the field.

Bare-Pipe Protection

Bare pipe lines may usually be completely protected with 1 to 1½ ma. per sq. ft.; complete protection is seldom justified for bare lines, however, the preferred method being "hot spot" protection, as described in installment (11) of this series.

Bare steel tank bottoms are similar in their requirements to pipe lines; reaction to protective measures is frequently much slower, however; often several weeks are required to establish a film of hydrogen over the whole surface, as indicated by slowly rising potentials.

Steel surfaces in contact with fresh water at low or zero velocities—such as interiors of water tanks—require from 2 to 6 ma. per sq. ft. for complete protection, depending on the nature of the water. The low value is for water which contains 35 p.p.m., or more, of calcium or magnesium; these will "plate out" to form a calcareous coating at the surface of the metal. This coating has a certain insulating value, and will thus tend to concentrate the current at bare spots, so that a locally higher current density is obtained. The presence of this coating also locally raises the pH, so that fewer hydrogen ions exist to require neutralization; hence less current is required to maintain the protective potential. These coatings are soluble, and if the combined calcium and magnesium content of the water is less than 35 p.p.m., they will redissolve as fast as they are formed; hence such water requires the higher current density.

Motion of the water exerts a scouring effect which prevents the formation of calcareous coatings, and even of hydrogen films; consequently surfaces exposed to water in motion require higher current densities. It is extremely difficult to lay down hard and fast rules in such cases, for the critical points are those with the greatest scouring action, and this involves turbulence and pressure variations as well as average velocity. As high as 10 to 12 ma. per sq. ft. may be required under adverse conditions.

Steel in Sea Water

Steel in sea water requires 20 to 30 ma. per sq. ft. to place it under immediate protection. If 10 ma. is applied, the surface will polarize very slowly, so that several months may elapse before protective potentials are reached. At lower values, the surface may never polarize. If, however, the surface is first subjected to several days' treatment at high current density—50 to 100 ma. per sq. ft., a dense and sparingly soluble calcareous coating will be built up, and protection may then be maintained indefinitely at the low value of 2 to 3 ma. Any accidental injury to the coating will result in a temporary concentration of current which will effect repairs.

Soil and water are not the only corroding electrolytes encountered in industry—nor is steel the only metal subjected to attack. Without doubt, there are many possible applications of cathodic protection other than those which have been made. The current densities required, and the mechanical details of installations, will vary so widely that no general rules can be given; it is well, however, to preserve an open mind, and to investigate the possibility of applying this technique, which has been so spectacularly successful in so many applications, wherever a knotty corrosion problem arises.

Part 14 of a series by Marshall E. Parker, consulting engineer, Houston

Fig. 1—FROM OIL TO FIBER.—Terylene cloth is woven on experimental loom in fiber development department of Imperial Chemical Industries. Production of Terylene is based on petroleum-derived ethylene and paraxylene.

I.C.I. Wilton Works to Make Petroleum-Derived Terylene

$28,000,000 plant will manufacture 5,000 tons annually of continuous-filament yarn and staple fiber

by V. S. Swaminathan*

PLANT construction is now under way at the Wilton works in England for production of Terylene. This new synthetic fiber is the first all-British development of a super textile based on starting materials derived from petroleum. Commercial manufacture of Terylene is an undertaking of Imperial Chemical Industries, largest industrial enterprise in the British Commonwealth.

The name of the new synthetic is coined from the fact that it is made through reaction of terephthalic acid and ethylene glycol. Starting materials are ethylene, separated from cat cracker gases, and paraxylene which is also obtained from petroleum. Construction of the new synthetics manufacturing facilities in England follow closely behind the recent completion by du Pont of a $20,000,000 plant in the United States for manufacture of Orlon, another synthetic fiber using ethylene as a starting material.

Expansion program. — Only since World War II has Imperial Chemical Industries entered the petrochemicals field in a big way. Its postwar expansion plans entail an estimated capital expenditure of £80,000,000 ($225,000,000) of which £22,000,000 ($62,000,000) are allocated to the first stage of the Wilton petrochemicals project. Adjoining the Wilton petroleum cracking plant, the company is constructing a large plant to make Terylene, involving an outlay of approximately £10,000,000 ($28,200,000). The plant will have an annual capacity of 5,000 long tons, partly as continuous-filament yarn and in part as staple fiber. Provision is being made for its rapid expansion.

Terylene synthesis. — The polymer from which Terylene fiber is made is a condensation product of ethylene glycol and terephthalic acid, which are to be made from products of the new oil cracking plant by the Dyestuffs Division of I.C.I. which has been responsible for polymer development.

Terylene (Fiber V of du Pont) is a high-molecular-weight polyester produced by interesterification of terephthalic acid with ethylene glycol. The former is obtained by the oxidation of paraxylene which can be isolated in great purity from petroleum fraction. The latter is produced from ethylene via ethylene chlorohydrin, or by hydration of ethylene oxide.

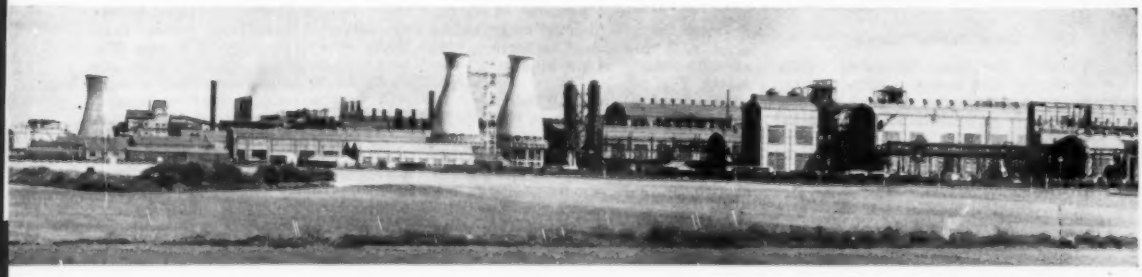
Product of British Research

The new synthetic is a product of British research, and was discovered by Whinfield and Dickson in the laboratories of the Calico Printers' Association, Manchester, between 1939 and 1941. It was studied during the early part of the war at the Chemical Research Laboratory, Teddington, but later I.C.I. acquired the world rights to the patents except for the United States where du Pont holds the exclusive license.

Development of the fiber was carried out by the plastics division of the I.C.I. at its experimental station at Welwyn Garden City, and in a pilot plant at its factory at Hillhouse near Fleetwood. The latter establishment had been producing continuous-filament yarns for market appraisal, and with the same object small amounts of staple fiber are now in production.

Like nylon, Terylene is made into fibers by melt spinning. Since no solvent is used the process is simple and clean. Fibers made from continuous-filament yarn are silk-like. By cutting the filaments into short lengths staple fiber can be produced from the

*5, Fielding Road, Bedford Park, London, W. 4.



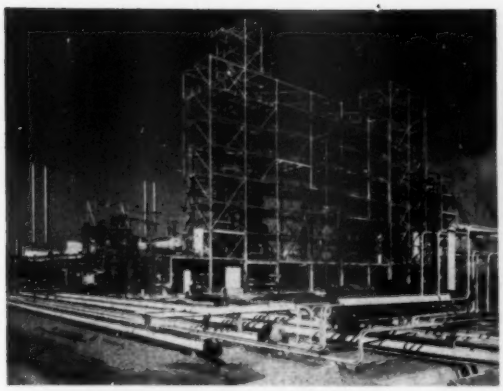


Fig. 2—FRACTIONATION PLANT AT WILTON.—Part of the petroleum cracking installation from which ethylene is obtained.

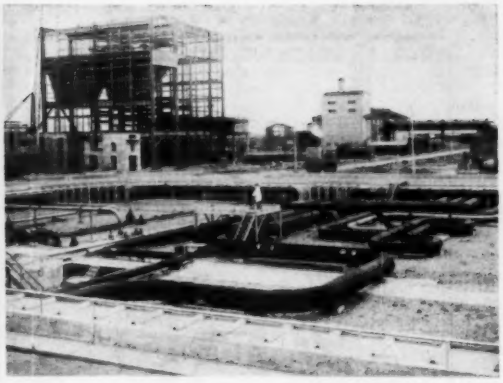


Fig. 3—STEAM AND POWER.—Framework of main boiler house, intermediate pressure boiler house, and service pipes.

fibers which are similar in appearance and feel to cotton and wool.

In view of its high resilience Terylene is expected to give a warm "lofty" staple fabric. The fiber is strong—8 gm. a denier, and 8 per cent elongation at break are attainable. By varying the drawing conditions it is possible to produce from the same yarn high-tenacity fibers for purely industrial purposes, or a general textile material of lower tenacity and higher extensibility which is easier to dye.

Terylene is also easy to process. It can be woven or knitted with extreme facility. Moreover, it is resistant to creep under load. It is, furthermore, highly resistant to deterioration by light; no other known fiber approaches it in this regard. In addition, it is highly resistant to chemicals, and to moisture, and has valuable electrical properties. Moths, fungi, and bacteria will not attack it.

In due course, Terylene is expected to find other outlets in the form of monofils, films, foils, or molding fibers, for example.

Wilton petrochemicals. — Designed and built by M. W. Kellogg Co. the Wilton catalytic cracker will process hundreds of tons of crude oil daily producing hydrocarbon gases from which more complex petrochemicals are to be built. At the present stage of development the two most important of these gases are ethylene and propylene. From the ethylene stream Wilton is making polythene, detergents, antifreeze and Terylene. Part of Wilton's ethylene will go to a polythene plant where it will be subjected to a high-pressure process developed by the company's technicians.

Some of the ethylene will be sent by tanker to other I.C.I. factories. Some more will reach a plant making ethylene oxide by the chlorohydrin route, some of the oxide being hydrolyzed to ethelene glycol for the British antifreeze market. The rest of the oxide will be worked up to Lissopol N, the I.C.I. nonionic detergent, made by the condensation of ethylene oxide and alkylated tar acid made at Billingham on the opposite bank of the Tees River.

The propylene stream will be worked up to isopropyl alcohol and then to acetone, widely used as a paint solvent, and forming one of the raw materials for Perspex plastic. Acetone production will be carried out at Billingham, the Wilton propylene being sent there by the 10-mile pipe line passing under the Tees River through a tunnel 1,750 ft. long and 9 ft. in diameter.

The butane stream will be partly sold as bottled gas, or blended with gasoline produced at Billingham, as will the considerable quantity of gasoline from the Wilton cracker. The amount of heavy oils made in the cracking process will be relatively small. It is to be used for fuel purposes for the cracker itself.

The methane and hydrogen will initially be employed to partly replace the water gas made from coke used for hydrogen production.

At present two plants are in operation at Wilton—one producing Perspex sheet from methyl methacrylate monomer made at Billingham and the other manufacturing phenolic molding powder.

Construction is under way on plants to produce Alkathene (I.C.I. brand of polythene), ethylene oxide, ethylene glycol, formaldehyde, a-napththylamine, urea formaldehyde molding powders, and Lissopol N.

I.C.I. technicians are looking toward several specific enterprises, calculated to lead to the erection of new plants at Wilton. Among these are the development of new chemical outlets for C_3 and C_4 streams from the cracker; extraction of various pure aromatics from its gasoline stream; development of additional ethylene oxide derivatives and the working up

(Continued on page 111)

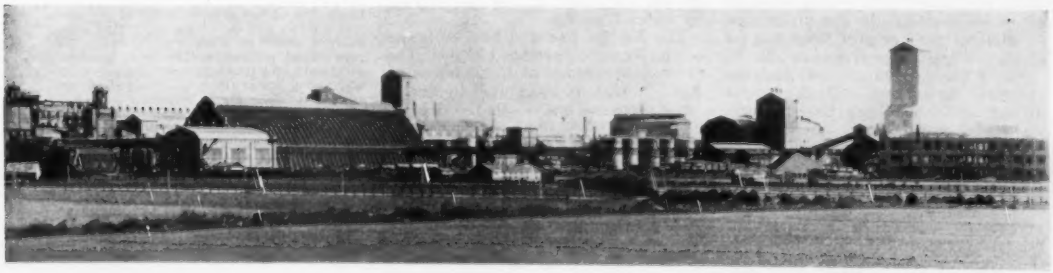


Fig. 4—BILLINGHAM WORKS.—Petrochemical operations at Billingham and Wilton complement each other. A large hydrogen plant is located at Billingham.

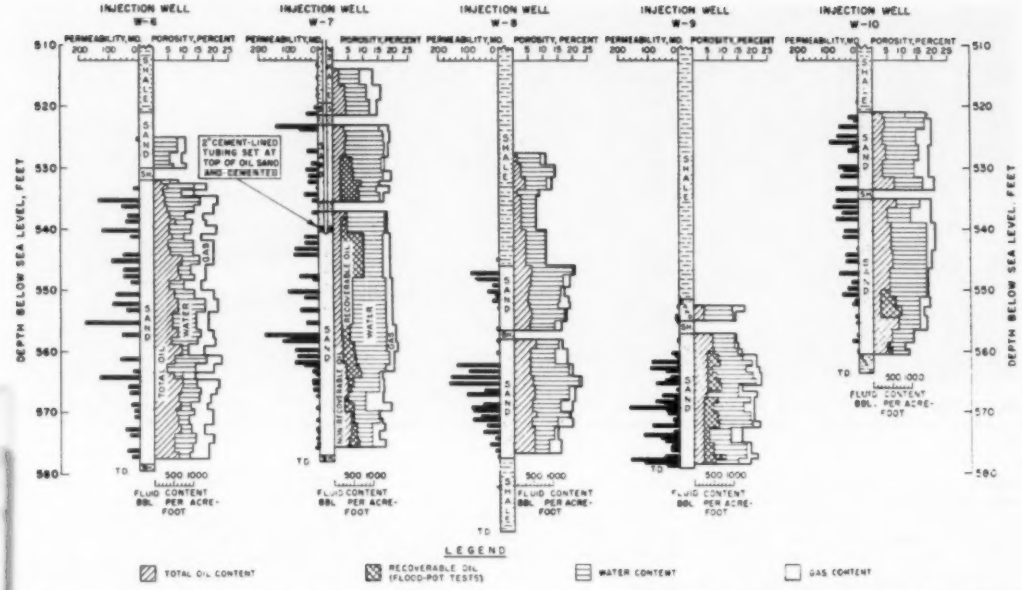


Fig. 1—West-east section of Bartlesville sand on the Keener Oil & Gas Co. Bartles Fee-Shailer project, 27-27n-13e, Weber pool, Washington County, Oklahoma.

WATER-FLOOD OIL RECOVERY

in Washington County, Oklahoma

2. Keener Oil & Gas Co. Bartles Fee-Shailer Project

by C. H. Riggs* and William C. Smith*

THE Keener Oil & Gas Co. Bartles Fee-Shailer project comprises 85 developed acres on the W. E. Shailer 30-acre, the Bartles Fee 50-acre, and the Main 10-acre leases, all in the south quarter of 27-27n-13e. In wells of this area, the top of the Bartlesville sand was penetrated at depths of approximately 1,235 ft. (535 ft. below sea level). Although the total thickness of the sand ranges from 35 to 70 ft., the upper beds are depleted of oil or were originally gas productive so that the thickness of floodable oil sand averages approximately 38 ft.

Fig. 1 shows comparative analyses of cores from five injection wells drilled on a west-east line through the center of the lease. The porosity of the oil-productive sand ranges from 15 to 22 per cent, and the averages 19.5 per cent. The permeability varies widely throughout the productive section and there is little correlation between wells, but the lower part of the sand is consistently the more pervious.

The oil content of the cores and the residual-oil content after flood-pot tests are shown as barrels per acre-foot. The total oil content of the cores ranges from 400 to 700 bbl. per acre-foot. Laboratory flood-pot tests indicate that from 220 to 500 bbl. of oil per acre-foot is not recoverable by water flooding.

The Bartles Fee and Shailer leases originally were developed in 1906. The production history of these leases to April 1, 1951, is illustrated in Fig. 2.

Past production history.—Vacuum was applied to the casing heads of the wells in 1916 and increased the rate of oil production from 4,650 bbl. in 1915 to 7,238 bbl. in 1917. It has been estimated from production-decline curves that had primary-production methods (including vacuum) been continued to January 1, 1951, on this 80-acre tract, 460,000 bbl. of oil, or 5,750 bbl. per acre would have been recovered.

Starting in 1927 all produced gas not needed for fuel was injected into the sand through one injection well located near the center of the 80-acre tract. No record was kept of the volumes of gas injected, but as part of it was used for fuel, the supply available for injection gradually declined until 1937 when all of the gas was needed for fuel and none was available for injection. At that time the injection well was plugged. The rate of oil production increased from 4,070 bbl. in 1927 to about 7,000 bbl. in 1929. Approximately 14,000 bbl. of additional oil was recovered between 1928 and 1937 as a result of the injection of gas. In 1939 gas injection into a well on the north line of the adjacent lease to the south was started and continued until 1943 at the rate of 10,000 to 15,000 cu. ft. daily. The rate of oil production increased gradually until 1943 and declined only slightly thereafter until water-flooding development was started in 1946. Fig. 2 indicates that about 51,500 bbl. of additional oil, or 650 bbl. per acre, would have been recovered by December 31, 1950, as a result of continued gas injection into the two wells starting in 1927.

Development by Water Flooding

A permit to water flood 285 acres in 22 and 27-27n-13e was granted to

*Petroleum engineer, U. S. Bureau of Mines Petroleum Experiment Station, Bartlesville, Okla.

Keener Oil & Gas Co. in September 1948 by the Oklahoma Corporation Commission. Development for water flooding was started the same year with the drilling of 15 input wells and 8 new oil wells. The wells were regularly spaced in a 660-ft., five-spot pattern. Of the 11 old wells, 4 were retained during the "fillup" period to permit a check on the progress of the flood, but they since have been abandoned. Some of the old wells which had been abandoned prior to development for flooding were cleaned out and replugged to eliminate the possibility of their "breaking out" under pressure.

Water supply.—Water for flooding is obtained from two wells completed in the Arbuckle limestone, one at a depth of 2,625 ft. and the other at a depth of 2,523 ft. These wells were cased to the top of the limestone at a depth of about 1,750 ft., and a 30-ft. section at the bottom of the hole was shot with 60 qt. of nitroglycerin. In March 1951 approximately 500 bbl. of brine per day was being produced from the oil wells and mixed with the supply-well water to be treated in a 1,600-bbl. wooden tank with Dearborn Chemical 844. The water plant is operated as a closed system with an oil seal approximately 18 in. thick on top of the water in the treating tank to prevent exposure of the water to the atmosphere. The water flows from the treating tank to the injection pumps.

Pressure plant.—The water-pressure plant utilizes an electrically driven vertical triplex pump and a vertical quintuplex pump for water injection. Fig. 3 is a flow diagram of the treating and injection system. The plant on the Bartles Fee-Shailer property also supplies water to the Daniels-Deal project to the north. The volume of water injected into each well and the injection pressure are controlled and measured at a central manifold at the water plant. An analysis of the untreated water from the supply well shows the following:

	P.p.m.
Alkalinity, methyl orange	280
Free carbon dioxide	101
Total iron	19
Dissolved oxygen	trace
Supersaturation of carbonates	63

All new wells were shot with 2 to 2½ qt. of nitroglycerin per foot of oil sand. Water-input wells were completed with 2-in. cement-lined tubing set on a packer at the top of the oil sand and cemented with 15 sacks of cement. Oil-producing wells are pumped 24 hours daily with individual pumping units driven by 5 or 7½-hp. electric motors.

Water injection was started in April 1949 and the rate of oil production began to increase the following June, reaching a peak of about 1,000 bbl. daily in November 1950. It has declined only slightly since. Fig. 2 illustrates the production history by years since the lease first was developed, and the monthly record of oil and water produced and water injected during the past 2 years. Although the rate of water production has increased since October 1950, the rate of oil production has been well maintained.

By April 1, 1951, the oil production attributable to water flooding amounted to 417,672 bbl. or 4,900 bbl. per acre. Approximately 1,871,200 bbl. of water had been injected. The ratio of cumulative water injected to oil produced as a result of water flooding was 4.5. The 417,672 bbl. of oil produced by water flooding compares favorably with approximately 511,000 of oil produced from these leases during the previous 42 years of operation.

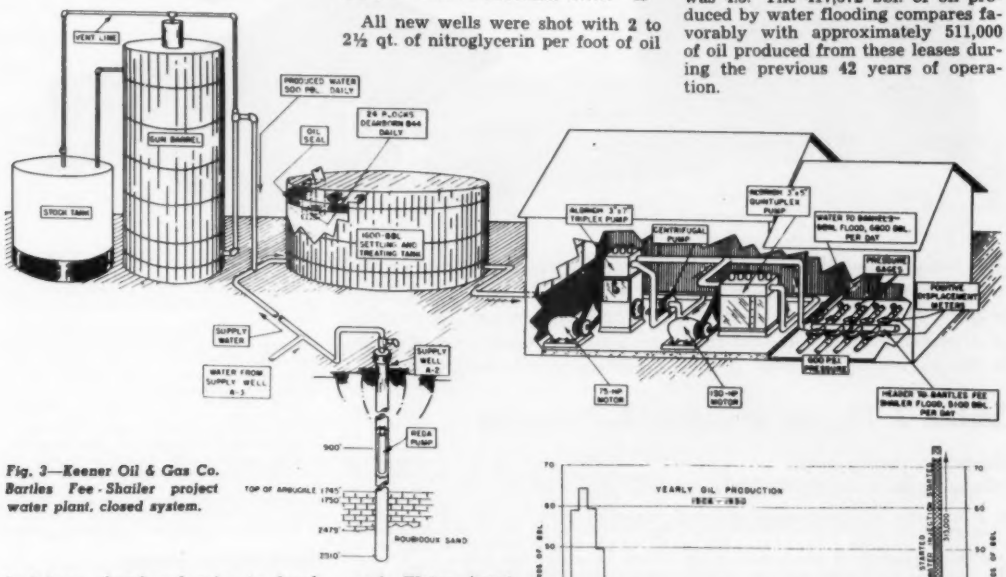


Fig. 3—Keener Oil & Gas Co. Bartles Fee-Shailer project water plant, closed system.

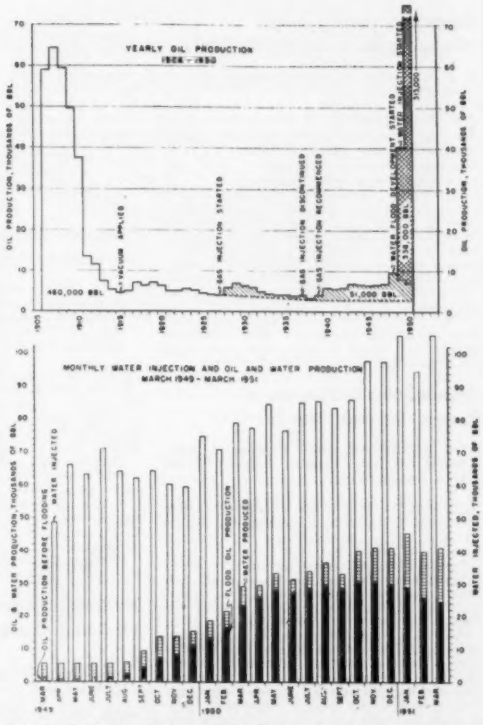
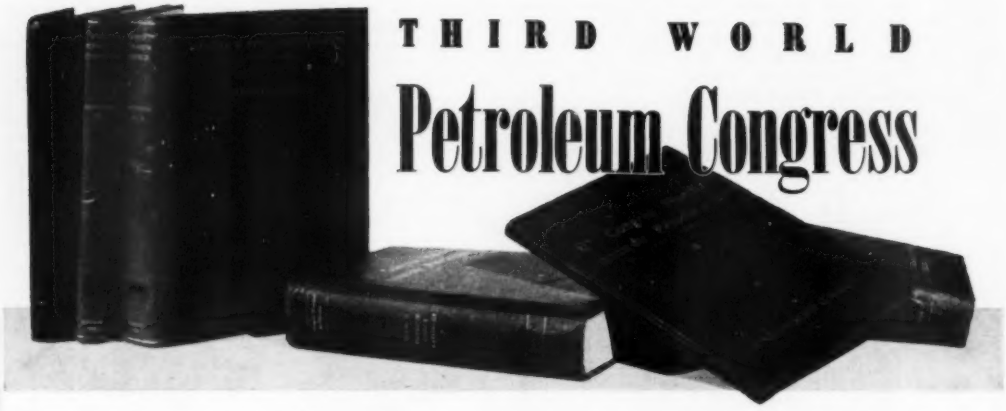


Fig. 2—Production history of the Keener Oil & Gas Co. Bartles Fee-Shailer project.

DIGESTS OF TECHNICAL PROCEEDINGS . . .



THIRD WORLD Petroleum Congress

This is the second of two technical reports covering engineering papers at the Third World Petroleum Congress, held at The Hague, the Netherlands, May 28-June 6. The first report appeared in last week's issue. In attendance for the Journal at this important oil meeting are Kenneth B. Barnes, managing editor, and W. L. Nelson, technical editor.

Section 3: Physical Operations in Processing

Extraction Processes for Manufacture of Lubricating Oils

E. J. DAWSON, Shell Refining & Marketing Co., Ltd.

RECENT progress in solvent extraction has been in development of existing techniques. The advances have been in size of plant and in economy and simplicity of layout and operation.

There has been a swing in favor of extraction towers instead of mixer-settler systems since towers exhibit advantages in capital cost and in ease and economy of operation. These advantages are, however, gained at the expense of some efficiency and accordingly much effort is currently being directed to improving extraction equipment.

The rotating disk contactor, pulsating-flow columns, columns with alternate packed and mixer sections and centrifugal contactors are examples of this trend.

Adsorption: A Review of Recent Process Trends

J. A. BERRIMAN, Shell Refining & Marketing Co., Ltd., Stanlow Refinery, Cheshire, England.

AS regards adsorption of gases, a proposal for utilizing the adsorptive capacity at low temperatures of cheap adsorbents for the low-pressure bulk storage of normally gaseous hydrocarbons is considered; the volume capacity of such adsorbents under these temperature conditions is approximately equal to half its volume of liquid hydrocarbon.

Passing a stage further to the separation of gaseous constituents by selective adsorption, a process example is selected which illustrates the possibilities of the fluid-bed process. It seems clear, however, that the countercurrent moving granular-bed type of plant as exemplified by the Hypersorber process, will be superior in separative power.

The methods and possibilities of selective adsorption of hydrocarbons from the liquid phase are outlined, and a full-scale continuous unit described which is capable of segregating aromatic and olefin fractions. There is further indication that separation of normal and isoparaffins is possible. It would appear that the possibility of developing truly continuous moving-bed units is not high because of the inherent physical interrelations of liquids and solids, and therefore process development is likely to be on the lines of cyclic multiple fixed-bed systems.

Variable Reflux in Multicomponent Distillation Calculations

W. R. VAN WIJK, Laboratorium voor Natuur-en Weerkunde, Landbouwhogeschool, Waeningen; and A. H. DE HAAS VAN DORSSER, Algemene Technische Afdeling T.N.O., 's-Gravenhage.

THE calculation of a distillation in which the reflux is variable can be reduced to that of a distillation at constant reflux if:

1. The partial molar latent heats of evaporation are constant and sensible heat effects may be neglected.

2. The molar enthalpy of the total vapor varies linearly with the equilibrium constant of a reference component.

3. The molar enthalpy of the total liquid varies linearly with the reciprocal value of the equilibrium constant of a reference component.

The relative volatilities are assumed to be constant in cases 2 and 3.

Hydrogen Fluoride Extraction Of Sulfur Compounds

A. P. LIEN, D. A. McCAULAY, and B. L. EVERING, Standard Oil Co. (Ind.), Whiting, Ind.

THE degree of extraction of organic sulfur compounds with anhydrous liquid hydrogen fluoride is dependent on the molecular weight, the configuration of the substituent group, and the type of sulfur compound. This is in accordance with the relative basicity of these compounds.

Certain sulfur compounds do not remain unchanged during extraction but undergo intra- and intermolecular reactions in the presence of hydrogen fluoride to yield more extractible compounds.

These findings have important applications to the extraction of sulfur compounds from petroleum. Besides the removal of sulfur compounds as the insoluble ionized complexes, secondary extraction of aromatics also occurs. Comparison of hydrogen fluoride extraction with conventional extraction solvents shows hydrogen fluoride to be more selective and ideally suited as an extraction solvent for petroleum stocks.

Hypersorption Process For Gas Fractionation

C. BERG, Union Oil Co.

THE Hypersorption process is a new tool for the chemical and petroleum industry in the recovery and separation of extremely volatile and low-concentration gases. The process employs a moving bed of activated carbon to adsorb and fractionate the components of a gas stream. Success of the process was to a large extent a triumph in the development of techniques for processing the solids-gas contacting operation and the achievement of new and precise methods for control and instrumentation of solids flow. These are fully described in the paper.

The Hypersorption process has now completed over 4 years of commercial operations. Units with capacities ranging up to 16,000,000 cu. ft. per day are in operation. As many as four well-fractionated products can be produced from a single Hypersorption tower. Present installations treat gas streams derived in petroleum refining, chemical manufacture, and natural-gas operation.

A New Dewaxing Agent (Precipitator Solvent Couple)

H. POELL, Technical University, Vienna.

WITH the combination of the wax precipitators 1.1 dichloro ethane and 1.2 dichloro ethane a solvent-precipitator couple has thus been found for centrifugal dewaxing which must be considered fully equivalent to the solvent-precipitator couple acetone-benzol almost generally used for dewaxing with filtration; furthermore, it

meets all the requirements for centrifugal dewaxing.

If properly applied 1.1 and 1.2 dichloro ethanes yield at every ratio of admixture a well crystalline, large-scaly paraffin wax precipitate which can easily and quickly be separated by either centrifuging or filtration. Dewaxing at extremely low temperatures does not present any difficulty, as in these cases a further addition of 1.1 dichloro ethane is sufficient to obtain a pure wax precipitate without selective secondary effect (slabby precipitation).

Modern Petroleum Processing

GEORGE H. WEBER, refining editor, The Oil and Gas Journal, New York City.

MODERN petroleum refining incorporates a wide variety of techniques for the physical separation and chemical conversion of crude-petroleum compounds. Adapting most of the unit operations employed in the chemical industry, petroleum refiners have augmented these basic techniques with a continuous development of processes which transform the complex hydrocarbon mixture, called petroleum, into a wide range of fuels, lubricants, and other products.

The adaptation of such processes in specific refinery operations is governed by the basic characteristics of the crude to be processed, and the relative values of the various products which can be economically produced from it. The selection of refining processes is made with the object of converting petroleum into a combination of products representing maximum value.

Section 4: Oil Processes

Catalytic Cracking of High Nitrogen Charge Stock

J. W. SCHALL and J. C. DART, Houdry Process Corp., Marcus Hook, Pa.

THIS paper presents the results of a moving-bed pilot-plant investigation of the cracking characteristics of a high-nitrogen-content charge stock. The charge stock used in this study was 21.2° A.P.I. gravity 910° F.E.P. gas oil containing 0.4 weight per cent nitrogen.

The experimental data have been analyzed and correlated to show the effect of the process variables, particularly cracking temperature, recycle ratio, and catalyst-to-oil ratio, on product distribution, and product quality. The nitrogen distribution in the product stream is also given. A series of combination charts are presented which can be used to estimate product distribution and/or the effect of process variables on product distribution. These charts are easily adaptable to other high-nitrogen-content charge stocks by means of appropriate reference lines which can be established with a minimum of two sets of experimental data.

Contribution of the Houdry Catalytic Cracking Processes

W. F. FARAGHER, H. D. NOLL, and R. E. BLAND.

THIS paper recounts the history of catalytic cracking from its beginning in 1920 to the present day. Major events are traced through the pioneering development and commercialization stages of the Houdry catalytic cracking processes.

The development and improvement of cracking catalysts employed by these processes are reviewed. A description of a typical design of the Houdriflow catalytic cracking process is included, because this process has been perfected since the last World Petroleum Congress meeting.

Desulfurization of Low Boiling Distillates With Fluid Cracking Catalysts

E. F. SCHWARZENBEK, C. E. SLYNGSTAD, and J. A. KNAUS, M. W. Kellogg Co., Jersey City, N. J.

DESULFURIZATION of low-boiling distillates was accomplished by passing the oils over silica-alumina cracking catalysts with no extraneous hydrogen. Significant percentages of the sulfur-containing compounds were converted principally to hydrogen sulfide without extensive conversion of the hydrocarbons to gas and coke. Effects of operating temperature, space velocity, feed-boiling range, catalyst type, and feed-sulfur type were investigated in a fluid catalyst pilot plant.

The desulfurization of virgin West Texas low-boiling distillates at 650° F. resulted in the removal of 60-80 per cent of the sulfur as hydrogen sulfide with the production of only 0.3-1.6 per cent coke plus dry gas. The liquid recoveries, including produced butanes, were practically 100 per cent.

The desulfurization of thermally cracked California distillates resulted in the removal of only 15-30 per cent of the sulfur, and the production of coke plus dry gas was 1.8-2.6 per cent. The liquid recoveries were about 98 per cent.

EDMONTON
CANADA
CALGARY
U.S.A.
VANCOUVER
VICTORIA
SEATTLE
PORTLAND
American dollars are growing in the
WORLD'S NEWEST OIL FIELDS
SAN FRANCISCO
LOS ANGELES
"YOUR MANAGER"
Another Texas!
That's more than a byword in Alberta, Canada—with production and prospect records following the Lone Star State's path of fame.
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Alumina-Silica Cracking Catalyst—Influence of Aluminum Content on Activity

M. W. TAMELE, L. B. RYLAND, and W. G. SCHLAFFER, Shell Development Co., Emeryville, Calif.; and L. D. RAMPINO, Tide Water Associated Oil Co., Avon, Calif.

CRITICAL study of the procedures for the preparation of alumina-silica catalysts throws considerable light on the influence of aluminum content on activity and on the nature of the active centers.

It has been shown that, under certain conditions, aluminum ions undergoing hydrolysis in presence of silica gel may, instead of forming aluminum hydroxide, become attached to silica surface by condensation with the terminal hydroxyl groups of the gel. At the point of attachment, one equivalent of acid is formed for each aluminum atom introduced into the surface. Aluminum becomes a part of the surface acid anion which is in turn firmly anchored to the silica-gel skeleton by primary valence bonds.

It is further shown that, for a given aluminum content, alumina-silica gel of the highest activity is obtained when the preparation is carried out so that all aluminum ions are attached to silica gel by this mechanism. Changes in preparative procedures which progressively lower the amount of aluminum ions reacting in this manner result in progressively lower activity; the increasing excess of alumina thus formed does not contribute to activity. Neither pure silica, nor pure alumina appear to have a measurable activity.

The most probable structure of the active centers formed by this interaction is presented and discussed in relation to various structures suggested previously by others.

Gasoline Sweetening Operations, Palembang Refinery

E. C. CAMPIONI and J. P. CORDIA, N. V. Standard - Vacuum Petr., Mij., Sungei Gerong, Sumatra, Indonesia.

AT the Palembang refinery of Standard-Vacuum Petroleum Maatschappij in Indonesia, a double-stage soda-sweetening process has been developed to sweeten the 6-8 copper-number gasoline. Existing conventional doctor-sweetening units have been used for this process without making any oil-line changes. In the new process the sour gasoline is consecutively treated with a weak and a strong caustic soda solution. The weak solution is made up by diluting the partly spent strong soda effluence, and after being spent, is discarded.

Some saving in chemical consumption was effected by switching from the former doctor-sweetening process to the soda process. However, the main advantage of the new process proved to be the considerably lower treating losses incurred. It had been estimated that for the average throughput of the first half of 1950, the new process would yield an increase in gross realization of $660 per day or roughly $240,000 per year. Actual plant data for the first half year of 1950 have confirmed these estimates.

Operating Variables and Reactions in Suspensoid Cracking

R. K. STRATFORD and C. H. CAESAR, Imperial Oil Co., Ltd., Sarnia, Ont., Canada.

THE suspensoid cracking process, which has been used in commercial operations since 1940, employs relatively small amounts of catalysts in coil-type tubular reactors similar to those used in conventional pyrolytic cracking. The catalysts which are used give improved product quality and, by adsorbing materials which tend to form coke, enable operations to be conducted at much higher temperatures and pressures than would be possible without them.

The effects of temperature, pressure, reaction time, and feed-stock boiling range on the product quality and distribution are generally similar to those observed in pyrolytic cracking. In addition, the catalyst has been shown to be effective in promoting reactions of carbon bond rupture, polymerization, alkylation, and hydrogen transfer and in the production of branched-chain paraffins and aromatics.

Catalytic Cracking of Pure Compounds and Petroleum Fractions

H. H. VOGE, G. M. GOOD, and B. S. GREENSFELDER, Shell Development Co., Emeryville, Calif.

THE principal reactions occurring in catalytic cracking are clearly shown by experiments with pure hydrocarbons. In mixtures of hydrocarbons each compound cracks about as it would alone. If naphthenes of certain types are present, the saturation of olefins by hydrogen transfer is increased.

Silica-zirconia-alumina and silica-alumina catalysts give very similar products.

Nitrogen compounds like quinoline and acridine strongly inhibit the cracking of hydrocarbons. Oxygen and sulfur com-

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pounds of types likely to occur in petroleum have little effect on hydrocarbon cracking, but may themselves be decomposed.

Gasoline yield from the cracking of a gas oil under specified conditions can be predicted if molecular weight and carbon-type analysis are known, and if the content of nitrogen bases is not high. Naphthenic stocks are outstanding for gasoline production. Gasoline compositions may be correlated with feed compositions with the aid of analyses of liquid products from pure hydrocarbons.

Coke deposition on cracking catalysts is strongly dependent on feed composition. Aromatic compounds, especially of the condensed, polycyclic type, form the greatest amounts of coke among nonolefinic compounds, while paraffins form the least.

Improved Process for Polymerization of Olefins With Phosphoric Acid On Quartz Catalyst

G. E. LANGLOIS and J. E. WALKEY, California Research Corp., Richmond, Calif.

AN improved catalytic process for the polymerization of C_3-C_4 olefins to produce motor gasoline is described. The catalyst, which consists of a film of phosphoric acid on crushed quartz, has the advantages of low cost, high mechanical strength, ease of regeneration, and of permitting simple reactor design.

Correlation of the results of an extensive pilot-plant program and of many years of commercial operation provides the basis for selection of optimum operating conditions for any refinery-stock situation. The improved process, employing fine-mesh quartz and feed quench, and operating at optimum acid concentration, pressure, and temperature, results in exceptionally low investment and operating costs.

Head office of Shell Nederland N. V., The Hague. This company is the sales organization of Royal Dutch-Shell products for the Netherlands.

Section 5: Production of Chemicals From Petroleum; Their Properties and Applications

Thiophene from Hydrocarbons And Hydrogen Sulfide

R. F. McCLEARY, L. E. RUIDISCH, C. H. CULNANE, and R. E. CONARY, The Texas Co.; J. T. CLARKE, Ethyl Corp.; and L. W. DEVANEY, Baylor University.

THIOPHENE may be prepared from hydrocarbons and hydrogen sulfide over a variety of catalysts including chromia or molybdena on alumina, bauxite, or silica. Production of thiophene is greatest from the normal C_4 hydrocarbons especially the olefins. When using hydrocarbons containing more than four carbon atoms in a straight chain not only thiophene but also alkyl thiophenes are formed. The reaction is mildly endothermic and can easily be carried out in a fixed-bed system. Preferred catalysts can be regenerated with air. Because of the highly exothermic nature of the regeneration, a fluidized catalyst system is advantageous in permitting more rapid regeneration of the catalyst at a given maximum temperature.

Properties and Applications Of Petroleum Derived Synthetic Detergents

A. H. LEWIS, A. L. MEADER, and D. F. SEARLE, California Research Corp., Richmond, Calif.

IN recent years synthetic detergents have become a major contribution of petroleum and chemical technology to world-wide economy. The majority of washing compositions are still based on soap manufactured from fats and oils but synthetic detergents, particularly those derived from petroleum, have found a large and growing place in this field. This paper discusses the properties which have led to the successful application of the alkyl aryl sulfonate type of detergent in washing compositions.

The two major commercial types of alkyl aryl sulfonate detergents are those with the alkyl group derived from kerosine and those with the alkyl group derived from polypropylene. The hydrocarbon portion of the former is manufactured by chlorination of an appropriate kerosine fraction, followed by condensation with benzene, usually with aluminum chloride as catalyst. In the case of polypropylene, the benzene is alkylated directly with the olefin.

Detergents from Petroleum—Production and Properties

FOSTER DEE SNELL and IRVING REICH, Foster D. Snell, Inc., New York.

AT present the two most promising types of product are the alkyl aryl sulfonates and the polyoxyethylene ethers. The former is already the largest selling type in the United States and appears to be gaining in popularity elsewhere. The latter is not yet sold in tremendous volume but is certainly on its way. The fat-based detergents, including fatty alcohol sulfates, fatty acid monoglyceride sulfates, and fatty amide sulfates and sulfonates may retain their present markets for a few years to come.

This would represent a balance between an expanding general market for detergents and a shrinking percentagewise market for these fat-based detergents. They will probably always have some place in the market but it is expected that as time passes their place will become less and less prominent.

Petroleum Oil Fractions as Insecticides for Citrus In California

L. A. RIEHL, University of California, Riverside, Calif.

IN California, petroleum-oil fractions have proved to be the most efficient insecticide per unit cost for most of the dominant insect and mite pests of citrus in the area.

The development of spray oils for citrus, their role in the pest control program for this crop, the response of the citrus tree to oil treatments, and the recent investigations in this field are reviewed. It has become increasingly apparent that consideration must be given to the interrelationship of two aspects of the application of spray oils to citrus trees, the insecticidal efficiency of the oil, and the response of the tree to the presence of that oil.

Surface-Active Agents from Petroleum—History and Statistics

JOHN R. SKEEN and FOSTER DEE SNELL, Foster D. Snell, Inc., New York.

STEADY increase in the proportion of surfactants derived from petroleum is shown by statistics of the U. S. Tariff Commission and derived figures. The same trend exists in other countries, modified in each case by local conditions.

The 1949 production of 429,000,000 lb. of surfactants is in part built further for retail sale. Complete petroleum derivation except for sulfuric acid for sulfates and sulfonates arises from production of dimers, trimers, and tetramers, cyclizing to produce benzene, and production of ethylene oxide.

Many are of mixed origin, as for example an ethylene oxide derivative of mannitol. The history of the appearance of the market of each major type is reviewed, including the green sulfonates and mahogany sulfonates from petroleum.

Production of Detergents From Petroleum

FOSTER DEE SNELL, LYMAN H. ALLEN, JR., and ROBERT A. SANDLER, Foster D. Snell, Inc., New York.

THE reason for the continually expanding production of petroleum-based synthetic detergents are discussed briefly. Using a built alkyl aryl sodium sulfonate as a typical example of petroleum-derived synthetic detergents, the raw-material requirements, processing steps, characteristics of drum-dried and spray-dried products, equipment requirements, and materials of construction are outlined in detail.

A typical product formulation is given and the raw material and plant-utility requirements for 1 ton of this product are noted. Production costs, in a small plant, are roughly 14-15 cents per pound of dried built alkyl aryl sodium sulfonate detergent.

A New Chemical Industry Based on Allyl Chloride

D. L. YABROFF, Shell Development Co., Emeryville, Calif.; and JOHN ANDERSON, Shell Chemical Corp., Houston.

ALLYL chloride, D-D mixture, allyl alcohol, synthetic glycerine, epichlorohydrin, diallyl phthalate, and EPON resins are being manufactured commercially today by Shell Chemical Corp. Manufacture of these materials has been undertaken in the past few years, and constitutes the basis for a new and fast growing segment of the chemical industry based on these and other allyl compounds and derivatives. Production of the basic intermediate, allyl chloride, by the high temperature chlorination of propylene, and its conversion into allyl alcohol and glycerin are described. Some of the reactions and applications of these and other allylic compounds and derivatives are discussed.

Section 6: Measurement and Control; Analyses And Testing; Composition of Petroleum

Analytical Mass Spectrometry In the Petroleum Industry

W. S. YOUNG, R. A. BROWN, and F. W. MELPOLDER, Atlantic Refining Co., Philadelphia.

THE progress made in analytical mass spectrometry is reviewed from its start in 1942. Early work is mentioned only briefly but more recent work concerned with type analysis and particularly that utilizing elevated temperature is dwelt on at some length.

A method for analyzing gasoline in terms of four compound types, viz.: (1) total paraffins, (2) total cycloparaffins and monoolefins combined, (3) aromatics, and (4) a group consisting of cyclomonoolefins, diolefins, and acetylenes is described. By utilizing a heated sample-introduction system certain compound types in gas oil and waxes may be determined.

Economics of Instrumentation In Petroleum Refining

PROF. A. M. PLATT and PROF. G. L. FARRAR, Texas A. & M. College.

MODERN petroleum-refinery operation is almost completely continuous. Through adequate instrumentation, more and better product is produced at less cost. Most plants would be inoperable without the application of automatic control.

Installation of continuous analyzers and controllers in product streams is perhaps the most economically lucrative application of instruments. Much improvement in product quality is noted.

Data from many plants (several examples are given) indicate that installed instrument cost should be about 5 per cent of the total investment, and maintenance equipment cost should be about 0.1 per cent of the total investment.

Classification and Evaluation Of Crude Oils

K. W. SCHNEIDER, Institut fur Erdolforschung, Hannover.

A METHOD of classifying crude oils is described covering, as in the case of paraffinic oils, up to 92 per cent of the oil ingredients witho :t applying strong heating. For carrying out analysis the crude oil is distilled at a top temperature of 280° C., whereby two fractions are received which are analyzed for their groups of hydrocarbons by the method of Lipkin. Of the oil components with higher boiling points obtained by a separate vacuum distillation the colorless and slightly yellowish-colored oil ingredients are isolated by using the adsorption method and of these the refractive index is ascertained.

By the use of a graphical representation the percentage of paraffins in the eluate may be estimated. For a simple classification of crude oil an index is suggested which states the quantity of colorless and yellowish-colored mineral-oil components as well as their percentage of paraffinic ingredients. The quantitative determination of particularly valuable oil-mixture components as well as the characterization of their chemical compounds by an index might prove to be of great benefit for the evaluation of crude oil.

Properties of Venezuelan Crude Oils

W. L. NELSON, technical editor, The Oil and Gas Journal, Tulsa; JOSE MARTORANO, B., chief director; and G. THERY FOMBONA, Head Dept., Fiscalization, Oficina Tecnica de Hidrocarburos Ministerio de Fomento, Caracas.

VENEZUELAN crude oils are predominantly intermediate base but they tend toward naphthenic properties. About 32 per cent of the production is typically naphthene base. The average sulfur content is high but generally lower than the sulfur content of crude oils of similar low gravities.

Straightrun and cracked gasolines exhibit higher octane numbers than United States gasolines, and their susceptibility to tetraethyl lead is superior. Relatively large amounts of aviation gasoline base stock can be produced from many of the crude oils.

The relatively low pour points of many of the crude oils permit the manufacture of large amounts of jet fuels and diesel fuels and a few of the crude oils contain low pour point lubricating-oil stocks.

Kerosines are generally inferior compared with those from United States crude oils but are considered satisfactory for most world markets. A few crude oils contain exceptionally high viscosity index, lubricating oils, and large amounts of wax, but the bulk of Venezuelan crude oil is unsatisfactory for lubricant manufacture unless solvent-treating processes are employed.

Spectrometric Methods Of Petroleum Analysis

R. ROBERT BRATTAIN, Shell Development Co.; and L. C. JONES, JR., and T. P. WEIR, JR., Shell Oil Co.

ANALYTICAL methods, based upon the interaction between electromagnetic energy and molecules or atoms, are discussed and examples are given of their application to petroleum research and manufacturing. Infrared absorption spectrophotometry is used as an example for the discussion of the extent of and reasons for the rapid growth within the last 10 years. The similarity between X-ray, ultraviolet, infrared, visible, emission, Raman, and mass spectrometry is emphasized by a discussion of the fundamental aspects of the interaction and electromagnetic energy and of the fundamental basis of all these analytical methods.

Section 7: Utilization of Oil Products

Stability and Compatibility Of Fuel Oils

C. W. G. MARTIN, Shell Petroleum Co., Ltd.

CERTAIN so-called residual fuel oils may, for reasons stated, develop instability and deposit sediment. The paper reviews the equilibrium of fuel-oil systems, explains what is meant by instability in its various forms, and discusses such phenomena as incompatibility and emulsibility.

The practical importance of the subject is obvious, particularly in the marine world, where some contamination of a ship's bunker tanks by salt water is almost inevitable. Nevertheless, the liability of fuel oils to form aqueous sludges in such circumstances has been given undue prominence by the publicity sponsored for proprietary additives which claim to separate or disperse such sludges.

Tests for assessing stability (and some misconceptions regarding their function and applicability) are discussed in this paper.

The conclusion is drawn that nowadays unstable fuels are almost nonexistent, while incompatibility is steadily being overcome, thanks to modern manufacturing processes and refinery technique which are continually improving the situation.

Utilisation des Combustibles Lourds l'Emploides Generateus A Pistons Libres en Traction Ferroviaire

FERNAND PICARD, Regie Nationale des Usines Renault; and R. HUBER, Societe d'Etudes Mecaniques et Energetiques.

UP to the present, all modes of production of thermal energy have been used in the construction of locomotives: viz. steam engine, steam turbine, diesel engine, gas turbine.

The gas generator with free pistons, combined with a turbine, has given very interesting results in fixed installation and in the propulsion of ships. It has now been applied for the first time to a locomotive of 1,000 hp.

The authors describe this achievement. The flexibility of the turbine fed by the generator with free pistons permits omit-

ting the gear box or the electrical transmission, which was necessary in internal-combustion engines.

The estimated driving force will probably exceed that of the best diesel engines now used. Tests lead us to believe that this tranction mechanism will be able to consume fuel oil.

Limiting Factors in Manufacture Of Lubricating Grease

S. J. M. AULD, H. M. DAVIES, and E. G. ELLIS, Vacuum Oil Co., U. K.

ONLY fatty acids in the comparatively narrow range of C_{16} or C_{18} are really suitable for grease manufacture, preferably as glycerides, which account for some 70 per cent of the fatty stocks used. Calcium, sodium, and aluminum are the commonest soaps employed and greases made from them are able to meet almost all requirements.

The properties of the mineral-oil component must be considered in connection with the solubility of the soap, the phase-transition temperature, and the nature of the colloidal structure. The use of solvent-refined oils causes more syneresis than conventionally refined oils but the more paraffinic oils while reducing the tendency of the grease to stiffen after heating may give rise to poor resistance to shear. Conventional manufacturing processes are reviewed and the simplicity of the soap-body method for lime-base grease is stressed. Reference is made to systems for continuous grease production and the importance of cooling rate is emphasized with reference to aluminum soaps.

Advances in Utilization Of Tetraethyl Lead

J. B. MACAULEY, Ethyl Corp., Detroit.

THE trend towards increasing compression ratios, involving an increased use of TEL (tetraethyl lead) in automotive gasolines in the United States has depended on six factors: First, gains in engine efficiencies from higher compression ratios have been demonstrated in recent road tests. Second, the fuel antiknock value required at the higher compression ratios has been shown to depend on the combustion-chamber design and is best expressed on the A-N Performance Number scale.

Third, TEL retains its effectiveness in base stocks of high antiknock value, especially when these are rated by the mild Research Method, the one preferred for correlation with road ratings. Fourth, TEL is not responsible for the increase in the antiknock requirement of an engine that is caused by the accumulation of combustion-chamber deposits. Fifth, satisfactory volumetric efficiency and freedom from roughness have been attained in postwar engine designs with compression ratios as high as 12 to 1.

Sixth, the major difficulty occasioned by the use of TEL—namely, the decreased durability of exhaust valves in engines in heavy-duty operation—can largely be overcome by selection of improved valve steels and use of sodium cooling and valve rotators. For aviation gasolines, recent tests using a new bromine compound as the TEL scavenger offer promise of improvement in engine durability and in other respects.

Choice of Asphalt for Asphalt Roofing

EDWARD H. BERGER, Asphalt Roofing Industry Bureau, New York.

FUNDAMENTAL properties which should be considered in the selection of asphalts for the manufacture of asphalt roll roofings and shingles and for use as mopping cement in built-up roofing are discussed.

Tables covering the characteristics of typical roll roofing and shingle saturants, coating asphalts, and asphalts for built-up roofing as well as specifications for their purchase are given.

Detergents for Motor Oils

C. M. LOANE, L. W. MIXON, and F. S. WOOD, Standard Oil Co. (Ind.), Whiting, Ind.

DETERGENTS are used in almost all types of motor oils in the United States. There is a trend toward higher concentrations of detergents in oils for passenger automobiles and in oils for heavy-duty service. Heavy-duty oils containing from 1½ to 2 times as much detergent as the currently used oils will probably find widespread use, and oils containing even higher concentrations of detergents are required for especially severe service. Motor oils can be classified into six types, depending upon their detergent content. Detergent oils are finding new applications in stationary diesel engines, gas engines, small airplanes, and automatic transmissions.

The detergents used commercially in the United States are metal derivatives of sulfonic acids, of phenols, of organic phosphorus compounds, and of carboxylic acids. There is a wide difference in the effect of the different types of detergents on the oxidation stability of the oil. Car-

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boxylate and sulfonate salts are catalysts of oxidation, whereas salts of alkylphenol disulfides are oxidation inhibitors.

The volume of detergents used in motor oils is increasing rapidly. It is estimated that by 1953 almost 15,000,000 gal. of detergent-inhibitor additives, valued at about $25,000,000, will be annually used in the United States.

Specificity of Pour Point Depressions in Lubricating Oils

R. A. RUEHRWEIN, Monsanto Chemical Co., Dayton, Ohio.

MONOMOLECULAR films of a series of n-alkyl polymethacrylates and of two n-alkyl polyacrylates were spread on water and the temperature at which the state of film changed from solid to liquid was measured. The melting point of the oriented film was found to depend upon the length of the alkyl chain.

The pour point depressant activities of the same polymers were measured in petroleum oils of −20, 0, +20, +40, and +60° F. pour point. The length of the alkyl side chain on the depressant polymer is specific for optimum depression of an oil of given pour point, the specific alkyl chain length increasing with increasing pour point of the nontreated oil. The temperature coefficient of the specific alkyl length is about two carbon atoms per 40° F. of pour point.

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Section 8: Equipment, Materials, Corrosion

Standardization of Petroleum Equipment

A. C. McGECHAN, Anglo-American Oil Co., Ltd.; C. SCHIMMEL, N. V. de Bataafsche Petroleum Maatschappij; and H. J. ZASS, Anglo-Iranian Oil Co., Ltd.

THE authors under the Oil Companies Materials Committee nave been concerned with the preparation of British standards for petroleum equipment.

The purpose of standardization is to obtain a ready supply of equipment of adequate quality at economical cost.

Stress is laid on the international character of the petroleum industry. While its practice is based largely on American standards, it is necessary to purchase equipment in other countries and obtain material interchangeable in dimensions and quality.

Preparation of British standards for petroleum equipment is described. In this work there is liaison between the British Standards Institution and the American Standards organizations.

Transmission de Chaleur Sans Paroi

J. L. BARBOUTEAU and H. POISSON, E.N.S.P.

WHEN there is no danger of the formation of emulsions due to the nature of the hydrocarbons or the cooling waters, it is possible to replace condensers and coolers for the white products of a distilling unit by apparatuses of simple construction which exchange heat directly by means of water without an intermediate wall.

Liability to fouling is eliminated and no maintenance is required. The quality of the products is not affected.

The heating of black products by a level surface of hot water is based on the same principle of heat exchange by direct contact. An example is given, applied to the heating and decantation of wet crude.

Application and Comparison Of Various Types of Cooling Equipment

JAMES G. DEFLON, Fluor Corp., Ltd., Los Angeles.

THE atmospheric cooling devices discussed are spray ponds, atmospheric cooling towers, induced-draught cooling towers, natural-draught cooling towers, and air-cooled exchangers.

In Europe, the hyperbolic or natural-draught tower has proven to be the most popular. This is primarily due to the difference in economic conditions. In American industry, a cooling tower is usually depreciated over a period of from 2 to 8 years, and the electrical energy required to operate the unit is usually available at from $35 to $50 per horsepower year. In Europe, a cooling tower is depreciated over a period of from 10 to 30 years, and power costs are figured at from $60 to $100 per horsepower year. One set of economic conditions encourages a lower initial cost with higher operating horsepower, while the other encourages higher initial cost, but requires lower operating cost.

It is felt that air-cooled exchangers will, in the future, find wider use both in American and European industry because they eliminate the entire intermediate water circuit and its maintenance. For areas in which water is scarce or of poor quality

this seems the most satisfactory solution to a difficult problem.

New Stress Calculations and Temperature Curves for Integral Flanges

W. P. KERKHOF, N. V. de Bataafsche Petroleum Mij., The Hague.

NEW temperature curves for the calculation of the necessary bolt loads are developed, making a difference between flanges for covers and flanges for connecting pipe lines on which an external-bending moment is acting owing to thermal expansion.

The occurrence of leakage has been studied at room temperature, at higher temperatures, and at the highest temperatures when the material creeps. The bolt load decreases at increasing temperatures. Due to this fact the flange should be calculated at room temperature, being the worst condition.

In order to take into account the effect of the bolt holes, a safety factor relative to the yield point at room temperature of 1.2 is recommended, being in agreement with the test results.

For the calculation of the flange stress a similar safety factor relative to the yield point at room temperature is recommended.

The result will be that flanges calculated according to the recommended method will be thinner than flanges calculated according to the formulas of the A.P.I.-A.S.M.E. code.

Welding of Metals Important To the Petroleum Industry

H. G. GEERLINGS and C. VOLLERS, Koninklijke-Shell-Laboratory, Amsterdam.

PRACTICALLY all construction metals can be joined by some welding method. It depends entirely on the circumstances whether these joints are suitable for practical use.

After a definition of the concept "weldability" the weldability of various metals is assessed. A test is described for determining this property for thin sheet metal, the welded joint being subjected to the Erichsen cup test. Criteria are the depth of indentation and the type of crack. The factors are studied which limit the welding of chromium-molybdenum steels, widely used in the oil industry. The possibility of facilitating welding by the use of austenitic electrodes is discussed.

It is of great importance to specify weldability tests and to find a correlation between these tests and practical experience. A better appreciation of the test method will make it possible to relax specifications for the metal supplier. For, the latter should be allowed as much latitude as possible in the choice of his production method. Our experience has indicated that, on the other hand, the customer should have at his disposal adequate means of checking the quality of the product supplied.

La Surete et l'Economie dans la Protection des Canalisations Southerraines en Acier

O. L. BIHET and H. GOLDSTEIN, Usines a Tubes de la Muese a Flemalle-Haute.

PIPE lines in Belgium are corroded by clay-type soils and stray currents. A most satisfactory way of protection, also in an economical sense, is a moderately heavy, reinforced bitumen coating in conjunction with a system of cathodic protection.

From long-time low-voltage conductivity tests and from actual practice it appears that a blown-asphalt bitumen to which a filler such as talcum may be added and reinforced by a bitumen-impregnated glass wrapping gives a very good coating.

Especially in western Europe this protective system is extensively applied.

Section 9: Transport, Storage, Distribution

International Petroleum Tables—Their Origin, Development, And Practical Importance

H. HYAMS and H. R. HOLMES, Shell Petroleum Co., Ltd., London.

THE Institute of Petroleum and the American Society for Testing Materials, realizing the need for standard tables for the metric system, have produced such tables after consulting a number of countries using the metric system. These bodies have also revised and extended C410 and the I. P. Tables.

It is hoped that these tables will receive world-wide recognition and later be universally accepted by national standardizing bodies through the International Standards Organization. These new standard tables, as were the previous tables, are entered against specific gravity, which is a simply determined physical property.

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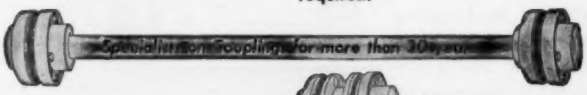

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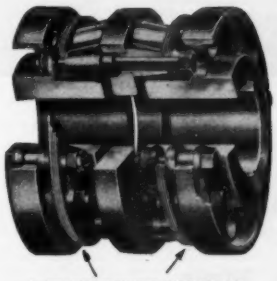

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Slippage Errors in Positive Displacement Liquid Meters

NORRIS PLANK, Shell Oil Co., East Chicago, Ind.

SINCE there is no published work on the slippage characteristics of positive displacement liquid meters, the author has undertaken a special meter-testing project at East Chicago, Ind., to furnish information. Laboratory results tend to prove that slippage errors are of considerable magnitude and follow definite patterns of viscosity vs. head-loss relationship. Limited field tests indicate slippage characteristics of large meters follow a definite similar pattern.

It is concluded that it is possible to obtain accurate readings from a displacement meter without making test runs each time viscosity or head loss changes. By proper use of this information more economical methods for the operation of pipeline meters may be developed.

Progress in Oil Measurement Standardization in the U. S.

L. C. BURROUGHS, Shell Oil Co., New York.

THIS report summarizes progress in oil measurement standardization during the past 40 years in the United States pointing out the lack of adequate standards covering procedures and equipment for many bulk oil measurements.

Because of this situation a committee was organized in A.S.T.M. about 10 years ago for the purpose of preparing complete standards for measuring oil in bulk. This work, a cooperative effort with the Institute of Petroleum (England), is nearing completion. The background of the work, its nature and the publications which are being issued are described.

Size and Speed of Tankers And Recent Improvements In Construction

JOHN LAMB and R. L. BROWN, Anglo-Saxon Petroleum Co., Ltd., London.

THE paper discusses the incentives to build lager tankers and the factors which limit the size of such ships. Size in relation to strength is also dealt with.

To illustrate the phenomenal growth of the world's oil tanker fleet during the past 20 years the number of ships built or on order in January of the years 1930 and 1950 is given below. Tankers of 1,000 tons deadweight and under have not been included but it can be assumed that in the period reviewed there has been a great tonnage increase in this class of oil tanker also.

	1930	1950
Number of tankers	1,272	2,149
Deadweight tonnage	10,100,000	24,450,000
Per cent of world's shipping, in numbers	8.52	15.1
Per cent of world's shipping, in gross tons	11.69	21.0
Tankers building or on order, in numbers	85	174
Tankers building or on order, in d.w. tons	872,000	2,850,000

New Techniques in the Gathering, Measurement, and Sampling Of Crude Oil

B. R. WALSH, E. W. JACOBSEN, and R. J. S. PIGOTT, Gulf Research & Development Co., Pittsburgh.

THE first section of the paper discusses gathering crude oil from the well to the pipe line from the aspect of obtaining quantities for production records or sales and exchange purposes. It is herein indicated that the first requirement is correct measurement. Since crude oil is not a homogeneous material, measurement alone is insufficient and adequate sampling must accompany measurement.

The second section deals with the requirements for sampling and discusses the sampling methods now in use and one or two new methods.

The third section discusses measurement of flow both in gases and liquids, the requirements and limitations for accuracy, the physical conditions, and the calibration methods to keep the metering instrument in proper range of accuracy.

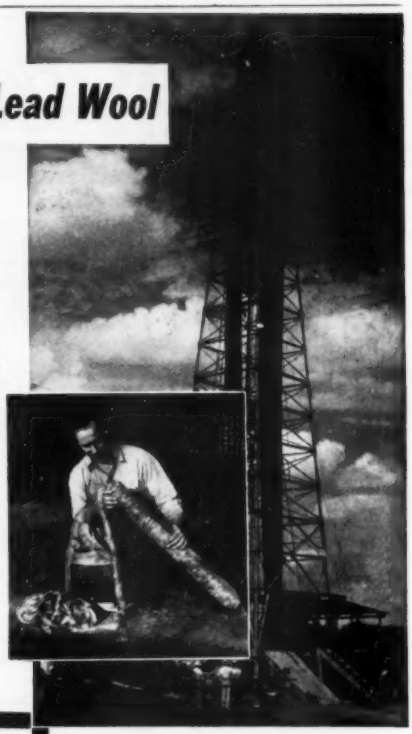
La Pollution dans le Transport Par Pipe Line des Produits Du Petrole

PAUL LEFEVRE, Standard Francaise des Petroles.

IN practice it is not always feasible to use very long pipe lines for transporting only one product. Different grades of crude and different finished products may be pumped one after the other.

A theory of contamination was worked out, on the basis of the more modern studies concerning liquid flow in pipes. The shape of the composition curve of the contaminated zone and its length as a function of the two variables, distance covered in the pipe line and Reynolds number, have been determined.

The theory is fairly well in line with practical results and it is therefore possible



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to foresee with reasonable precision the contamination which may be expected in newly built pipe lines.

Reglementation Internationale Pour le Transport de Liquides Combustibles sur les Voies de Navigation Interieure des Pays De l'Europe Occidentale

F. C. HAANEBRINK, Phs. van Ommeren, N. V. Rotterdam.

IN order to insure the safety of the international transport of liquid fuels while avoiding the issue of contradictory instructions in the various countries of western Europe, a preliminary conference in 1933 laid down draft regulations which gave uniform rules for the construction and fitting out of tankers and other vessels designed for this kind of transport, and also governing the transport proper and the handling of these liquid fuels.

Although an agreement was only concluded in 1939 and has not yet come into force, the rules proposed have been followed since their publication and have even been incorporated in the national regulations of several of the contracting countries.

The regulations govern all details of the classification of products and of means of transport, and also the construction and fitting out of vessels specially designed for the transport of bulk and packed goods, and they further lay down instructions to be followed during the handling of the liquid fuels and while the vessels are on the move.

Progress in Oil Measurement Standardization in the U.K.

H. HYAMS, Shell Petroleum Co., Ltd., London.

THIS paper has been prepared as a companion paper to the one entitled "Progress in Oil Measurement Standardization in the United States" written by L. C. Burroughs, chairman of the American Society for Testing Materials, Division 2 As Burrough has plainly shown, standardization work in the field of oil measurement has progressed side-by-side in the two countries. Burroughs and the present writer agreed that the 1951 World Petroleum Congress provided a suitable opportunity for recording briefly the results of the individual and cooperative work undertaken by A.S.T.M. and I.P.

Use of Machine-Sorted Punched Cards in Documentation

BETTY BROWN PORTER and GEORGE S. CRANDALL, Socony-Vacuum Laboratories, Paulsboro, N. J.

THE paper describes a method for maintaining a centralized or library bibliography covering the petroleum field and related fields wherein the searching is conducted rapidly by punched-card machines of the I.B.M. or Hollerith type. The system could obviously be adapted to any other field desired.

A "polydimensional coding" system is described, in which the subject matter of interest is divided into numerous independent fields. Within each field the coding may be either direct, indirect, or a combination thereof. In effect the subject matter is coded simultaneously according to several unidimensional (e.g. decimal) coding systems.

Section 10: Economics and Statistics; Education and Training

Use of Statistics as an Aid To Management in the Petroleum Industry

W. J. HARRISON, Anglo-Iranian Oil Co., Ltd., London.

THE special position of the statistician is compared with other professional men in industry. These topics also are covered: Recruitment and training problems; changing nature of management's demands on statisticians.

Three main types of statistical activity are desirable: First, recording of a company's own activities; second, provision of an economic background; third, mathematical analysis of certain data.

The organization of statistical services in a large firm are discussed, as are problems of centralization and coordination, staff, and equipment.

Training Esso Men in Europe and North Africa

J. A. BARTON, Standard Oil Co. (N.J.).

THIS paper explains the various aspects of training in the Esso affiliates (induction, orientation, job, and special training), reviews in detail their supervisory training programs, such as basics of supervision, principles of management, and group conference leadership, and outlines the Esso management development training program. It also shows some of the accomplishments of the Esso affiliates in Europe and North Africa in the field of training.

Tanker Freight Rates and Their Fluctuations

P. H. FRANKEL, Manchester Oil Refinery, Ltd., U. K.

THE tanker market is compared with the much wider market for general cargo vessels resulting in steeper tanker freight-rate fluctuations between periods of high and low demand. The several methods by which tankers are available for the carriage of petroleum are analyzed: oil company-owned vessels, long and medium-term charters, short-term charters. Only about 5 per cent of total liftings are covered by short-term charters. The operating costs of tankers and long-term charter freight rates are more stable than short-term freight rates, which are thus less significant than generally assumed. The importance of representative freight rates for the price structures in importing countries is examined and tendencies to recognize medium-term charter rates as being economically relevant are described.

Problems of Classification and Documentation in the United States Patent Office in the Field of Petroleum and Allied Subjects

M. F. BAILEY, B. E. LANHAM, and J. LEIBOWITZ, U. S. Patent Office, Washington, D. C.

THE vast volume of documents covering all fields of technology and applied science and the legal factors imposed by the patent laws create individual and cumulative influences requiring special consideration and planning. Various types of searchers are explained to illustrate the needs for the novel classification developed, such as, the classification of patents on the basis of that portion of the disclosed subject matter in which the invention resides rather than upon the entire disclosure.

Specific classes of subject matter are discussed and compared to emphasize the fact that all documents of interest to or relating to the petroleum industry are not brought together on the basis of such interest or relationship, but upon a more fundamental one, which is described, to meet the requirements of patent searches under the law.

The paper also deals with a scheme being developed in the patent office whereby machine equipment can be used to perform patent searches for compositions of matter in terms of their ingredients or functions or both.

Influence of Cyclical Variations In Over-all Business Conditions Upon Demand for Petroleum Products

H. SCHWALL, R. D. BODIG, and E. B. SLADE, Shell Oil Co., New York.

THE need for developing as complete an understanding as possible of the quantitative impact upon petroleum products' demand of cyclical variations in business seems obvious in such a high volume field as the petroleum industry, where small percentage deviations from what actually materializes in the future are quickly translated into either a burdensome or tight stock situation, with all the drawbacks that such a position implies.

The paper analyzes statistically the influence of such over-all economic factors as national production and/or national income together with other important trends (such as time, for example) upon the deviations from normal trends in the demand for petroleum products.

Modifications Apportees Depuis 1937 aux Statuts Juridiques des Recherches d'Hydrocarbures en France Metropolitaine et dans les Autres Pays de l'Union Francaise

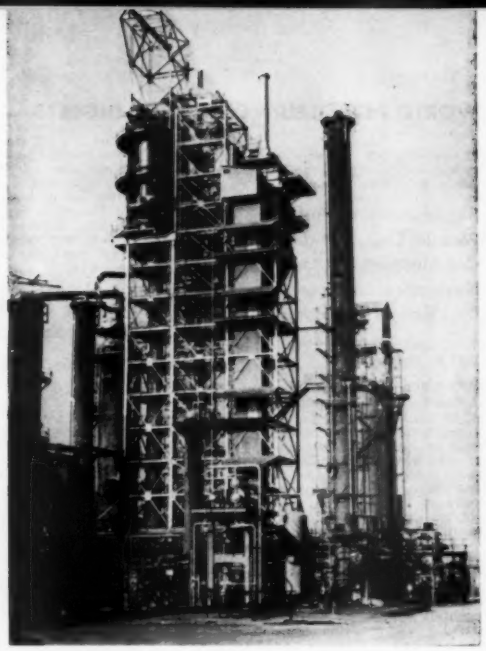
JEAN DEVEAUX-CHARBONNEL, Bureau de Recherches de Petrole.

SINCE 1937 the legal status governing exploration for hydrocarbons carried out in metropolitan France and the other countries of the French Union have been amended with a view to encouraging prospecting by private undertakings.

In the mother country and in Algeria substantial reforms have been effected in the exploration statutes while maintaining the essential principles.

Finally, being anxious to develop petroleum exploration on a large scale in the subsoil of the regency, the Tunisian legislators have in latter years instituted a number of special regulations inspired by new principles in order to facilitate the exploration and production of hydrocarbons.

Erosion-Control Materials Installed In Wilshire Oil's Norwalk Refinery



Wilshire Oil Co.'s catalytic cracker at Norwalk, Calif.

INCLUDED in the process of modification of the U. O. P. catalyst cracking unit in the Wilshire Oil Co., Inc., refinery at Norwalk, Calif., is the installation of abrasion-resisting linings in various process pipe lines and vessels. This particular type of lining has proven successful in other plants of similar construction and operation.

The fluid catalytic cracking unit at Norwalk was built by Defense Plant Corp. in 1944, and operated by Wilshire until August 1945 when it was shut down. After 5 years of standing idle, much of the auxiliary equipment required intensive overhauling.

The original lining in the reactor and catalytic regenerator was composed principally of refractory tile and fire brick. The catalyst lines were protected internally with firebrick and concrete. When the plant was opened for inspection preceding beginning of modification, lining in catalyst lines and chambers was found to be in a condition requiring extensive replacement.

The pipe originally installed to support the grids in one of the vessels had become scored with parallel grooves. Instead of replacing the pipes they were provided with a shield made of heavy angle iron. Sections of these protectors were placed snugly against the pipe with the outside angle facing the moving catalyst stream, tack welded at intervals to prevent vibration, and securely welded at each end to the respective pipe columns. This method of protection was used so replacement might be made during any shutdown when excessive wear was indicated. Otherwise, the entire post would require replacement.

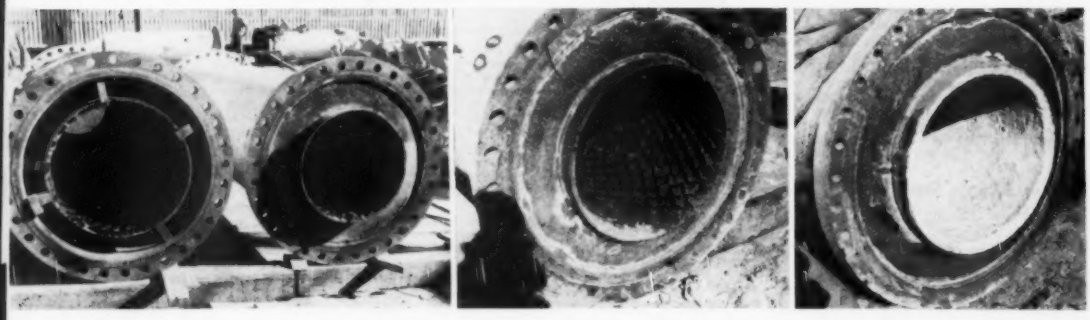
Spent-catalyst carrier lines, reactor charge lines, and standpipes were opened for inspection and all the original nonmetallic lining removed. Inside areas were sandblasted to assure a thoroughly clean surface to receive subsequent linings. Piping, constructed in long, flanked sections was taken down and placed on the ground nearby.

A ⅜-in. wall, steel pipe was fabricated and given a double wrap of tar paper on its outside. This pipe was inserted in the original pipe section and positioned to provide approximately 3½-in. annular space between the inner pipe and the original pipe.

At one end of the flanged-pipe section, the inner lining is flush with the face of the flange on the original pipe, while at the opposite end the inner section extends outward beyond the space normally occupied by the gasket. At the end of the pipe where the inner section is extended, a steel ring welded to the inner section closes the annular space opening. The opposite end is provided with four strips of steel which center the inner section in the pipe joint. When in position the inner section is lined with expanded metal having interstitial depth of approximately ¾ in.

The assembly (outer and inner pipe) is placed in an upright position, with the end having the steel-ring closure downward. A mixture of special cement and aggregate is then poured into the annular space and

Lining for the catalyst piping was installed on the job. Steel liners support the cement-type lining and serve as retainers for insulation. Expanded metal welded to the inside of the steel liner gives mechanical support to the cement-type lining. Opposite ends of the flanged pipe sections are shown at left. At center is shown a section of pipe ready for application of the cement-type lining, and at extreme right a completed section ready for installation is shown.



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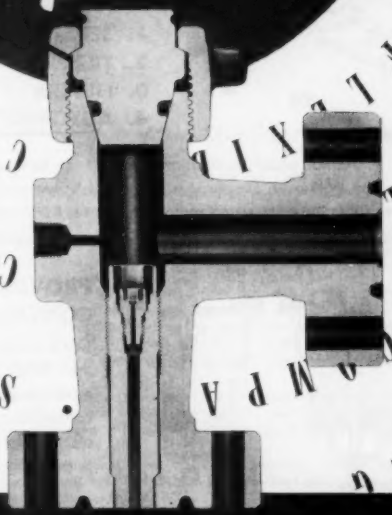

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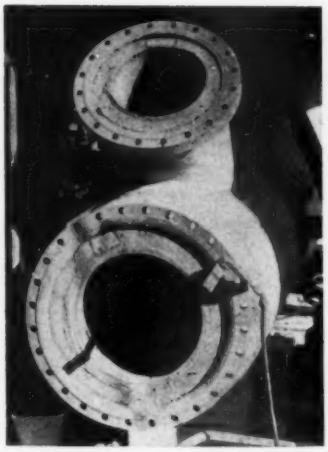
compacted with a vibrator until the space is completely filled.

After the cement has set, the flanged pipe joint is lowered horizontally on timber skids. Gladden & Bean cement is then trowled into the expanded metal to fill the openings and provide a coating approximately ¼ in. deep. When this coating has set it produces an extremely hard glass-like surface, which has been found to be particularly resistant to abrasion. In one other plant with this type of coating, inspection indicates that, if scouring does occur, the worn spots are easily repaired by applying a renewal coat with a trowel.

When the pipe sections are assembled in the standpipe and flanged tightly by bolting the connections, the finishing touches are made. A welder on a sort of bos'n's chair enters the standpipe and connects the inner lining ends by welding. A steel ring, slightly beveled at each side, is attached to cover any uneven edges and surfaces. This ring is then plastered over with the same type of cement applied to the expanded metal in the inner pipe section.

Reactor charge and spent-catalyst carrier lines were cleaned on the inside by removing all of the previously applied coating. An inner sleeve, similar to that applied to the pipe joints, is shaped and inserted in sections. Sectional application is necessary due to long bends and unusual shapes. The inner pipe is also spaced to provide an annulus which is filled with Atlas Lumnite cement by using a cement gun. Tamping with a vibrator is employed, and trapped air is expelled through narrow slots in the steel ring at the bottom of the lines, installed to retain the cement until set.



A portion of the spent-catalyst-carrier line. This view shows the insulating cement in place between the walls of the steel liner and catalyst pipe.

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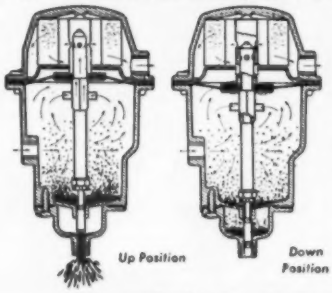
Actual plant installations as well as exhaustive laboratory tests prove the Wilkerson Diaphragm Operated Valve increases production, reduces tool maintenance and replacement costs by more efficiently controling compressed air contaminants.



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Noble Modernizes Rigs

(Continued from page 77)

used separately or together, and can be independently driven at several different speeds.

This pump underdrive arrangement permits coupling of the pumps very close to the substructure, permitting the use of shorter belting, and giving the rig a shorter-than-usual outline. Also, through the clutching arrangement, the rig is given a very flexible pump operation option. The shortened belting makes for more rapid rigging up and eases the problem of sheave alignment.

At the other end of the compound, completely mounted on a single skid, is the generation and draw-works motor equipment. The single skid mounting is provided so that there is a minimum of wiring to detach and attach during moves when the rig is broken down. The generator is located on the left side of the compound with switch gear and contactor box mounted nearby on the same skid. On the right or driller's end of the same skid is the draw-works motor, a direct-current machine identical with the generator. This skid, as is true of all the others, is quickly assembled into position by means of triangular

plates that are fitted with holes for pinned connections.

The generator produces 540 kw. at 300 volts and 3,000 amp. A 15-kw. generator furnishes excitation current, and current for rig lighting. The direct-current machines being used as motors and generators came off of mine sweepers.

The draw-works motor is connected to the hoisting machinery through a 3-to-1 chain reduction drive. The motor is rated at about 700 hp. at 300 volts and 100 r.p.m. A control box is mounted nearby on the skid.

The draw works on the rig pictured here was formerly on a steam rig, and has been thoroughly reconditioned and undergone improvement in Noble's shops. It is fitted with a 40-in. double auxiliary hydromatic brake. This brake is connected to the draw works either by manual arrangement or by pneumatic cylinder which is controlled from the driller's position. A separate air-operated winch is mounted on the rig floor for use in various hoisting operations. This use of the winch, with separate rotating equipment, permits hoisting operations to be done without shutting down the rotary table or without having to operate the draw works.

The rotary table is separately powered by a 250-hp. direct-current machine that turns the table through a 2-to-1 reduction gear. Having this separate drive unit gives the rig a degree of flexibility that is not ordinarily possible.

Other features of the redesigned rigs include a telescoping lower substructure section. This pinned, telescoping design permits easy adjustment of substructure to any rig-floor height. On this rig, the substructure is used with a 30-ft. base 136-ft. derrick. Use of the quick connections between skids and the specially designed substructure saves about a day in rigging-up or tearing-down time. The substructure is also fitted with special rigging for easy placement of large skidding beams when this method of moving is used.

An added important feature of the electric operation, particularly with well-muffled engines, is extremely quiet operation for a power rig.

Lease Tank Bulletin

The Division of Transportation of the American Petroleum Institute announces the publication of a Tentative Bulletin on Recommended Practices in the Setting, Connecting, Maintenance, and Operation of Lease Tanks.

The bulletin was designed to meet an industry need for a reference booklet on generally acceptable procedures in least-tank practices.

The Tentative Bulletin may be obtained from the American Petroleum Institute, 50 West 50th Street, New York 20, New York, at 25 cents per copy.

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for your Consideration:

1 . . . Compactness Note in the picture above the short axial length. Tubes 3" in size and larger are approximately 1 to 1½ diameters long, depending upon the velocity in the main. For high main line velocities (above 10 ft/sec. for liquids) tubes are less than 1 diameter in length.

2 . . . Ease of Installation Due to its compactness and because it requires no straight runs upstream or downstream, except near valves or regulators, the total space required for installation is but a small fraction of that necessary for other primary devices. It can be installed as readily as a fitting and in that section of the line most conducive to steady flow conditions. Moreover, it can be installed in the plant proper, eliminating the need for expensive vaults or housing.

3 . . . Reversibility The Foster Flow Tube is symmetrical transversely; upstream and downstream nozzles and ports are identical. This means that where processing calls for flow reversal, the meter can readily handle the changes.

4 . . . Low Head Loss Where head losses are important Foster Flow Tubes are designed with a main-to-throat ratio that provides negligible unrecovered head losses.

5 . . . Accuracy All Foster Flow Tubes are furnished with calibration curves obtained in laboratory tests simulating installation conditions and can therefore be guaranteed to an accuracy to meet any specification.

Foster Flow Tubes are recommended for a wide range of services metering the flow of liquids and wet or dry gases. They are available in all commercial pipe sizes with flanged or screwed connections. Standard lining is bronze but other materials are available. In writing for further information, give processing and installation details of your metering requirements.

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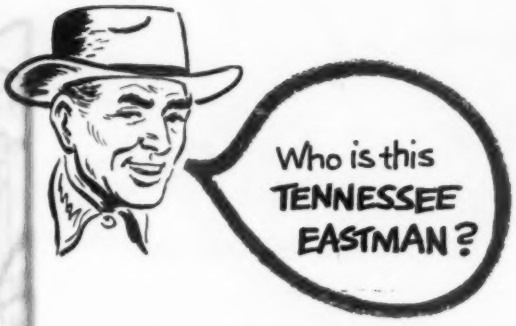

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AND TENAMENE 2—di-sec-butyl p-phenylenediamine—also a gum inhibitor

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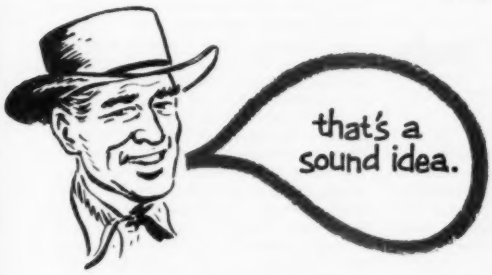
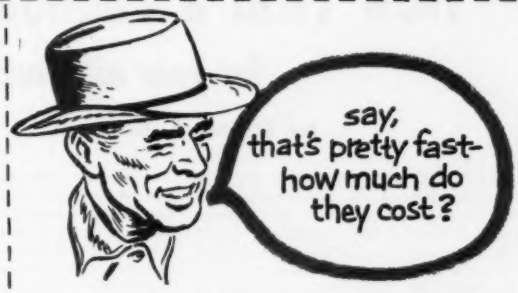


Sure it is! We're set up to give you top service, too. Here's the delivery story.



That depends on how much you order and what part of the country you're in. Tell you what—write to one of our sales representatives* or to Kingsport, Tennessee. They'll be glad to give you prices, specifications, send samples and any other information.

600 mi. radius—
48-hr. service

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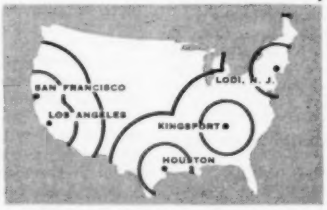

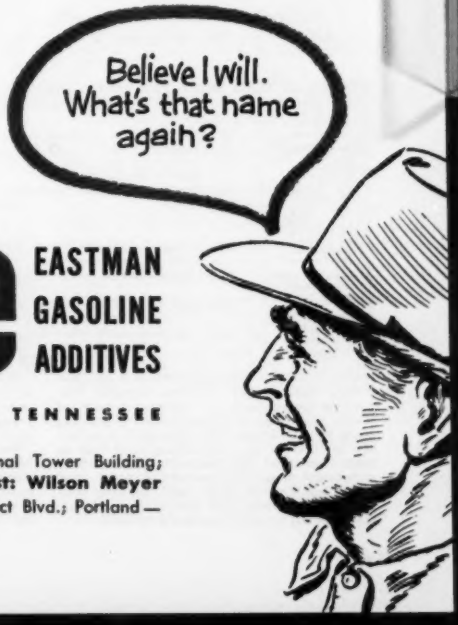

Tenamene

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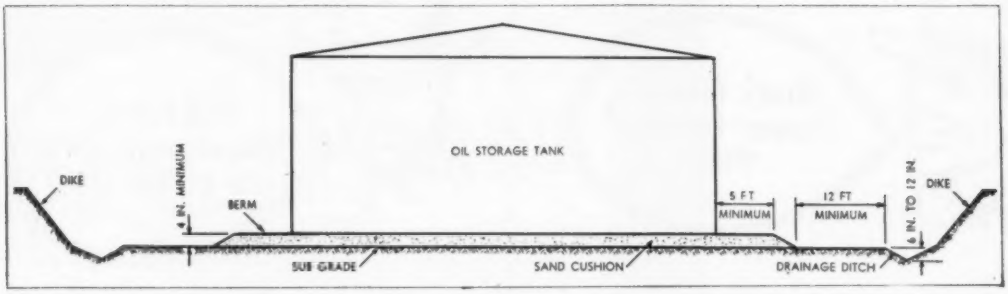
TENNESSEE EASTMAN COMPANY, KINGSPORT, TENNESSEE

***SALES REPRESENTATIVES:** New York — 10 E. 40 St.; Cleveland — Terminal Tower Building; Chicago — 360 N. Michigan Ave.; Houston — 412 Main Street. **West Coast: Wilson Meyer Company,** San Francisco — 333 Montgomery St.; Los Angeles — 4800 District Blvd.; Portland — 520 S.W. Sixth Ave.; Seattle — 821 Second Ave.



TYPICAL TANK GRADE.—Before placing sand cushion, all loam or other organic material should be removed from the original surface and replaced with well-rolled fill. Frequently the entire area is stripped and the strippings used in constructing the firewall. Berm should be protected against weather with trap rock, gravel or asphalt flashing.

How Firm a Foundation

for your oil-storage tanks

by Irving E. Boberg*

TOO often the importance of tank foundations is underestimated. Since the flat-bottomed oil-storage tank is one of the simplest types of structure and has sufficient flexibility to accommodate appreciable changes in shape, the foundation on which it rests is frequently given little consideration.

With the advent of larger and higher tanks the effects of poor foundations were multiplied. The larger tank not only imposes a heavier load and hence causes greater settlements, but the distortion caused by any given settlement is in some measure proportional to the size of the tank.

In addition, the floating-roof user has become increasingly conscious of the importance of a shoe-to-shell fit that is as nearly perfect as possible. It must be obvious that this can best be attained if the tank shell is built circular and remains circular within reasonable limits.

If the grade is not level in the beginning, or if it later settles unevenly, the tank will inevitably have a distorted shell. Often the tank builder is blamed for a poor shell that should properly be charged to a poor foundation. To obtain good tanks, good foundations must be provided.

There is no rule of thumb formula that can be applied to all situations. Each case must be evaluated on the basis of conditions as they exist. Local conditions vary so widely that it would be impossible to anticipate them all. An attempt has been made in the discussion that follows to deal with the more common aspects of tank-foundation design.

In selecting the proper type of foundation the bearing property of the soil is the primary factor. Where no previous experience in the same area is available, soil borings to determine existing conditions are usually cheap insurance against future trouble. We have seen a number of instances where tank sites were judged solely from surface conditions only to have the empty tanks settle so seriously during construction that the water test could not be performed until the foundation was corrected. With the tanks already erected, this could only be accomplished at great expense.

We know of one instance where a tank settled under water test to such an extent that it collapsed.

While these are extreme cases, they serve to illustrate the importance of first knowing the nature of the foundation base.

Soil-bearing tests are now generally conceded to have little value other than to evaluate conditions at the tested level. The depth to which an applied load will produce significant stresses is in some measure proportional to the size of the loaded area. A large tank fully loaded will probe out weaknesses never revealed by a test on 1 or 2 sq. ft.

Frequently the result of borings will indicate the desirability of limiting tank height rather than the expense of costly foundations.

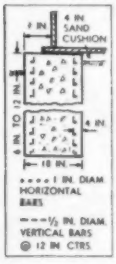
Sand Pad Simplest Foundation

Assuming that bearing conditions have been determined to be adequate, the simplest form of foundation is a sand pad laid directly on the earth. All loam or organic material should be removed and replaced with suitable well-compacted material. Often a satisfactory fill material is available at the site. If not, bank-run gravel is excellent and is readily compacted.

The grade for the tank should preferably be elevated slightly above the surrounding terrain to insure

*Chief engineer, Chicago Bridge & Iron Co., Chicago.

DESIGN OF RING WALL FOR 150-FT. DIAMETER BY 48-FT. FLOATING ROOF TANK STORING GASOLINE



W = steel weight on wall = 1,320 lb. per ft.
H = height of shell = 48 ft.
h = height of ring wall = 5 ft. (assumed 4 ft. frost line and 1 ft. above grade)
q = weight of stored product = 45 lb. per cu. ft.

$$T = \text{(thickness of wall)} = \frac{24\ W}{qH - 80h} = 18 \text{ in.}$$

Horizontal pressure on ring = $5 \times 0.3\ [(62.5 \times 48) + (100 \times 2.5)]$ = 4,875 lb. per ft. of wall

Total hoop tension = PR = $4{,}875 \times 75 = 366{,}000$ lb.

$$\text{Required area of hoop steel} = \frac{366{,}000}{20{,}000} = 18.3 \text{ sq. in.}$$

Use 24 bars 1-in. diameter.

NOTES

Ring wall to be founded below frost line.

Note that weight of stored product was used in determining T, whereas weight of water was used in determining reinforcing steel. It is believed that settlement is a factor of time as well as loading, and that in most cases the long term loading is more significant than the temporary water load under test. On the other hand the hoop tension due to water test load must be taken into account to avoid cracking of wall.

Where the characteristics of the confined soil are known, the designer should use the correct ratio between vertical and horizontal pressures rather than the safe limit of 0.3 used above.

For the shallow wall illustrated, the hoop tension was assumed uniform from top to bottom of wall. For high walls, the increase in lateral pressure with depth would require closer steel spacing at the bottom than at the top.

drainage. Sufficient berm should be provided to prevent washing and weathering under the tank shell. The berm width should be at least 5 ft. Weathering can be minimized if the berm is subsequently protected with trap rock, gravel, or an asphaltic flashing.

It is customary to provide a crown of about 1 in. for each 10 ft. of radius. On large tanks the crown is sometimes limited to 6 in.

The sand pad should be at least 4 in. deep. The sand should be clean and free from corrosive elements. Care should be taken to exclude clay or lumps of earth from coming into contact with the bottom. Frequently the difference in potential between two types of earth will set up an electrolytic cell which results in corrosion of the tank bottom.

Sometimes crushed rock is substituted for sand, but sand is easier to grade and usually more available.

While there is some difference of opinion, it is considered desirable to oil a sand grade. It is not satisfactory to merely pour oil on the surface because it will not penetrate or mix with the sand. Subsequent laying of the bottom will be difficult and welding is likely to start a fire. Oil and sand should be thoroughly mixed either in a concrete mixer or by "windrowing" with a grader or by hand. Only sufficient oil should be used to thoroughly wet the sand. Excess free oil will make subsequent working on the grade both difficult and hazardous.

If the sand cushion is placed on top of crushed-rock fill, the rock should be carefully graded from coarse at the bottom to fine at the top. If this is not done, the sand will percolate through voids in the rock.

An excellent base can also be obtained by substituting about 1½ in. of asphalt road-paving mix for the sand cushion. There is one precaution that must be carefully watched. After the material has set up, it is difficult if not impossible for the tank builder to correct inaccuracies by taking down the high and filling in the low spots. Therefore, it is most important that an asphalt paved tank grade be leveled with extreme accuracy under the shell.

Drainage is important both from the standpoint of soil stability and bottom corrosion. Good drainage should be provided not only under the tank itself, but also in the general area of the tank. Where the terrain does not afford natural drainage, proper ditching around a group of tanks may help to correct the deficiency.

Ring-Wall Foundation

Where suitable bearing soil is not available at the surface but is available a reasonable distance below the surface, a ring-wall foundation is indicated. The purpose of the ring is to confine the soil and prevent lateral movement. The ring wall is founded in the firm stratum and confines the weaker materials. Totally inadequate material should be removed and replaced with well-compacted fill.

Many tank owners use ring-wall construction as standard even when soil conditions do not indicate its use. There are a number of advantages in this practice that may well compensate for the added cost. The incidental advantages of the ring wall are neat appearance, an excellent foundation for the tank shell, the elimination of washing and weathering of berms, and the exclusion of surface water running into the grade.

Ring walls should be so proportioned that the unit soil bearing at the level of the bottom of the wall is the same under the concrete as under the confined soil. This can be accomplished and will encourage uniform settlement of the foundation.

Assuming the tank shell to be centered on the wall and earth to weigh 100 lb. and concrete 140 lb. per cubic foot, the thickness of the concrete wall may be determined from the following formula:

$$\text{Thickness of wall in inches} = \frac{24\,W}{pH - 80h}$$

where

W = weight of metal in shell and roof supported on the ring wall in pounds per foot of circumference.
H = height of tank shell in feet.
h = height of ring wall in feet.
q = weight of stored product, lb. per cu. ft.

In no case should the ring wall be less than 8 in. thick.

On tanks of relatively small diameter the above formula will result in ring walls less than 8 in. thick, in which case the 8-in. minimum should be used as the closest approach to the desired ideal.

Where a ring wall is used, it should be reinforced circumferentially to resist the hoop stress resulting from lateral pressure of the confined earth. Because soil conditions are rarely known in advance, it is our practice to design such walls on the basis of a lateral pressure equal to 0.3 of the combined liquid and earth vertical pressure. For shallow rings the vertical load contributed by the earth is small but on deep walls it can become important.

If there are openings in the wall, the reinforcing must be carried around such openings to preserve the continuity of the hoop action. Nominal vertical steel is normally provided primarily for convenience in placing hoop reinforcing.

Through the years there has been considerable discussion of the merits of placing the tank shell on the concrete versus placing the tank entirely within the ring wall. For many years we contended that the tank should not rest on the wall. It was feared that if settlement was greater within the wall than under the wall, failure of the bottom could occur.

On a carelessly prepared grade, this could happen and has happened. However, it has been our observation that hundreds, if not thousands, of tanks have been successfully erected on ring walls. There are distinct advantages to so doing. It gives the erector a better base on which to build and there is less danger of subsequent shell settlement and distortion. The ring wall is not only founded on better soil than exists near the surface, but there is no danger of erosion under the shell.

Therefore, we have changed our opinion and now recommend ring-wall construction with the tank shell resting on the wall, provided the following precautions are taken:

1. Proportion the ring wall so that soil pressures under the entire tank and wall are equal at the level of the wall base. The base of the wall should be below frost line.

2. Pour the ring wall against undisturbed earth without forms if possible. If this is not possible, see to it that backfill both inside and outside of the wall is thoroughly tamped in place. This is particularly important during cold weather when fill material may be frozen. If this is not conscientiously done inside the wall, serious settlement along the wall can damage the bottom.

3. The top of the ring wall must be level. This point is frequently overlooked. It is not generally realized what large shell deformations can arise from relatively small differences in ring-wall elevation. If the wall is out of level, the erector has no choice other than to erect on shims which involves the placing and maintenance of grout. Experience has shown that it is possible to insist on and obtain accurately leveled walls. A desirable criterion is that the wall shall be level within ¼ in. (plus or minus ⅛ in.) in one plate length (about 34 ft.), and that no two points on the wall shall differ in elevation by more than ½ in. (plus or minus ¼ in.). This may sound unduly restrictive, but it can be attained and will pay dividends.

In some cases, several layers of heavy asphalt-felt roofing are placed on top of the ring wall under the edge of the tank. This practice has merit in that it seals off the periphery. The bottom-joint breakdowns or backup strips settle into the felt and thus the effect of point bearing at bottom joints is minimized.

There are of course many pitfalls to be avoided in grade construction. If possible, always avoid situations where a tank rests partly on cut and partly on fill. If it cannot be avoided, see to it that the fill is of a readily compactible material and that it is well compacted. Be sure the fill is retained against lateral movement either by an adequate berm or a concrete ring.

The same caution applies to locations where rock occurs near the surface. Be sure the rock is under the entire tank and that the earth overburden is reasonably uniform in depth. Frequently rock strata will end abruptly and a good criterion is to locate tanks so they are entirely over rock or entirely off of rock.

Where soil conditions are such that none of the simpler foundation types are adaptable, piled foundations or other special types will require individual consideration for each case.

How TIMKEN® bearings helped flooded pump avoid a sea of troubles

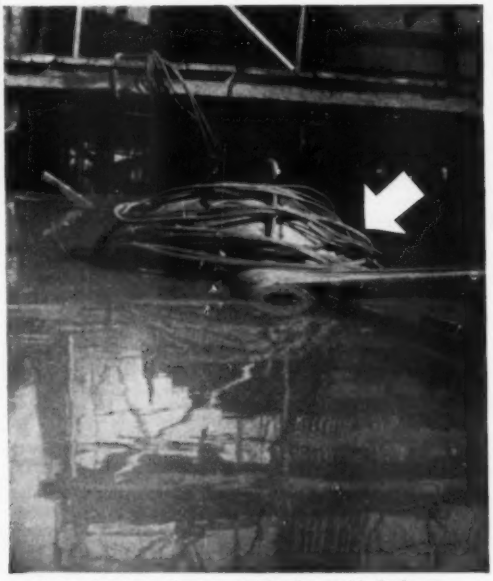
EVEN though this "Oilwell" No. 20-P slush pump was under water for over six months after an Alabama flood in 1949, it required only minor repairs to put it back into operation. The Timken® tapered roller bearings, mounted on the crankshaft back in 1937, gave the same dependable, trouble-free performance as before the flood.

Timken bearings have helped this "Oilwell" duplex power pump in the drilling of 36 wells—a total of 324,000 feet of hole. Today, after over a decade of hard work (and a six months' dunking!), the original Timken bearings are still giving good service. They carry the heavy load of the crankshaft with negligible friction, insure long pump life.

Line contact between rollers and races gives Timken bearings extra load-carrying capacity. Tapered design enables them to carry radial and thrust loads in any combination. Because of Timken bearings' true rolling motion, plus an incredibly smooth surface finish, friction is virtually eliminated. Made of Timken fine alloy steel, Timken bearings normally last the life of the machine.

No. 1 choice throughout industry, Timken bearings are backed by over 50 years of bearing research and development. Whether you build or buy equipment be sure to specify bearings with the trademark "Timken"—it's your assurance of top *value*. The Timken Roller Bearing Company, Canton 6, O. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



Arrow shows pump almost completely submerged in flood waters.

Power end view of pump ready to return to service after flood.

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roll ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN

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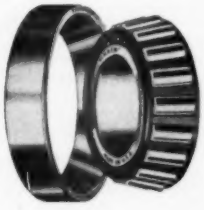
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ⊂⊃ THE TIMKEN TAPERED ROLLER ⊂⊃ BEARING TAKES RADIAL ⊖ AND THRUST →⊖← LOADS OR ANY COMBINATION ✳

PROGRESS in METALS

by W. L. Nelson
Consulting Engineer

Giant Bit—A Hard-Surfaced Casting

WHEN called upon to manufacture a giant star bit for drilling holes of 30-in. diameter to a depth of 40 ft., Star Drilling Machine Co., of Akron, decided that the normal practice of forging a high-carbon steel was not practical for producing the wide, flared-out ends of the bit. Note the size of the bit in the photograph.

Accordingly, the bit was cast out of 0.5 carbon steel, but of slightly smaller size than the specified size. The gage and face points which are the fastest-wearing areas, were then built up with layers of hard-surfacing materials. The use of weld metal is expected to extend the useful service life and to facilitate rebuilding of the bit when it becomes worn.

After casting the bit, the points of the face were built up with a single pass all the way across in each direction, using a Hardwell 100 electrode, a high-carbon type manufactured by Lincoln Electric Co. of Cleveland. This electrode was selected for the first pass because the deposit approximated the analysis of the casting.

Next, a single pass of Lincoln's Abrasoweld, a semiaustenitic, abrasion and impact-resistant, self-hardening material, was placed on each side of the center point all the way across. Finally, a single pass of the same filler metal was deposited directly on the point.

A similar process was employed with the gage of the bit, which was first built up almost to size and desired contour with several passes of the high-carbon electrode. Both the sides and the face were welded as needed, after which this hard deposit was covered with two passes of semiaustenitic material.

Machinability of Steel Improved by Lead

FOR many years there have been demands for steels which would combine the good qualities of open-hearth steel with easy machinability. It was generally recognized that the addition of lead lowered the friction component of steel in machining and reduced the amount of heat developed in the cutting edges of tools, thereby extending tool life and greatly lengthening the time between grindings. The problem, however, when adding lead to steel, was to secure uniform distribution throughout the steel with no segregation of lead to form soft spots.

The development of Ledloy, the trade name product of Inland Steel Co., and a discussion of its usefulness were given by Henry J. Holquist, of Joseph T. Ryerson & Sons, Inc., in the February 1951 issue of Materials and Methods.

After long, continued research by Inland Steel, a steel containing 0.25 per cent lead was developed in which the lead was so finely dispersed that it could not be seen under a microscope. In addition, the presence of the lead resulted in the steel having a slight refinement of grain, but had no appreciable effect upon its mechanical properties. In 1938 it was placed on the market under the trade name of Ledloy. During World War II, however, production of leaded steels for peacetime uses was greatly curtailed, and only within the past few years has production been resumed.

Considerable interest in leaded steels is being shown in the highly competitive business of making screw machine products where fractions of a second per piece cut from production time can spell the difference between profit and loss. On the basis of comparative demonstrations in jobbing shops, leaded steel has shown many advantages over A.I.S.I. B-1113 Bessemer sulfurized carbon steels which, for many years, have been accepted as the fastest-cutting screw steels available.

Leaded steel machines up to 50 per cent faster than B-1113 and allows greatly increased tool life, while retaining such advantages of open-harth-quality steel as good ductility, high impact values, good transverse strength, and effective case-hardening qualities. When carburized in the box at 1,700° F., the case hardness and depth of case approximate that of the open-hearth high-manganese, high-sulfur steels. Furthermore, the mechanical properties, from heat to heat, are more consistent than those of B-1113.

Typical of the performance studies of Ledloy were those made at the plant of Milled Screw Products Co., Chicago, a 100 per cent jobbing shop, operating 83 Brown & Sharp automatic screw machines, other machine tools, and a complete hand-screw machine department. The first study covered production of a plunger approximately ¾ in. long and made from ½-in. stock. Using a Brown & Sharp No. 0 automatic, the operations (in sequence) are: center, drill, ream, form, and cutoff. The step-down hole at the formed end is ⅛-in. diameter; at the cutoff end, $\frac{7}{64}$-in. diameter. Comparisons of machining time and speed follow:

	B-1113	Ledloy
Surface feet per minute	210	294
Time per piece, total operation, (seconds)	25	18½

Of course these figures, indicating a 40 per cent increase in surface feet per minute and a 36.3 per cent increase in production, do not reflect increased production, per machine hour due to longer tool life. Not only was a tool life five times as great secured, but also fewer rejections and a better finish.

Another study covered production

Fig. 1—Large cast drilling bit before application of hard-facing. (Courtesy Star Drilling Co. and Lincoln Electric Co.)

of an adjustment plug made from ½-in. stock and approximately ⅞ in. long. Using a Brown & Sharp No. 2 automatic, the sequence of operations is: threading ½ in.—20 thread, cut-off, and slot. The following comparisons in machining time and speed were obtained:

	B-1113	Ledloy
Surface feet per minute	220	276
Time per piece, total operation, (seconds)	17½	14

Again, these figures, which indicate a 25.5 per cent increase in surface feet per minute and a 25 per cent increase in production, do not take into account increased production per machine hour due to longer tool life. In addition, chaser life was doubled, a better finish secured, and over-all quality of product was improved, when using the leaded steel.

Although leaded steel costs about 13 per cent more than B-1113, the increased production per machine-hour more than offsets the additional material cost.

Jobbing screw machine operators are sometimes limited as to the steel they can use, depending upon customers' specifications. With faster-cutting screw steel available, specifications can frequently be changed with a resulting lowering of cost of the finished product. It should be pointed out, however, that when a faster cutting steel is specified, shop operations must be adjusted—speeds and feeds of screw machines increased—so as to realize the full cost-saving possibilities offered by the improved material.

Summarizing the results of the studies, the leaded steel was found to have three distinct advantages: (1) allows stepped-up speeds and feeds in machining; (2) permits longer tool life; and (3) allows production of higher-quality products with exceptionally fine machine finishes.

Uinta Basin Development Activity

(Continued from page 82)

was carried on the bit in the next well with a corresponding penetration rate of 4.1 ft. per hour. In the third well, which is a 160-acre offset to the first well, the penetration rate was increased still further to 4.7 ft. per hour by carrying 40,000 lb. weight on the bit.

From this limited experience in this particular area and at this particular depth in the Green River formation, drilling weights in the order of 30-40,000 lb. appear to give superior performance. It is also noted that the heavier weights resulted in slightly better bit performance in these particular wells. It should be mentioned that all wells drilled subsequent to the first well shown on this chart have carried weights over 15,000 lb. where it was possible to do so without drilling crooked hole.

For the most part the basin is not crooked-hole country; however, in certain instances maintaining a straight hole has presented a difficult problem. While in general increases in weights have effected substantial improvement in depths of some 8,500 ft., there is evidence that the higher weights may not solve the penetration problem at greater depths.

In the deepest well in the basin to date the penetration rate and bit consumption became so low despite drilling weights up to 40,000 lb., that it was found economical to continuously diamond core with 8¾-in. heads below 8,956 ft. The penetration with 9-in. rock bits decreased to low values of roughly 1 ft. per hour with a bit consumption of less than 10 ft. per bit.

Although the diamond-coring penetration rates from 8,956 ft. to 11,692 ft. as of February 1, 1951, were only slightly higher than with rock bits, the saving in trip time at this depth resulting from cutting 50-ft. cores and the reduction of approximately 20 per cent in bit cost effected appreciable economies. Economies were further enhanced due to the value of the complete core record. Core recoveries have been near 100 per cent. While economies have been effected by this procedure, it should be kept in mind that this is still high cost drilling.

Drilling Fluids

While the hardness of the Tertiary sediments is a costly factor as regards penetration, it is a distinct advantage from the standpoint of well bore stability. The relatively few fishing jobs have been of minor consequence. Despite this favorable condition, drilling fluid expenditures have been high due to (1) maintenance of low water loss mud over long periods of time throughout the Green River formation to minimize contamination of the oil show zones, and (2) lost circulation in certain wells in fractured areas.

In regard to lost circulation, weight control of the drilling fluids has been given special attention. In some instances, by maintaining the mud weight within certain limits, entrance of well fluids into the mud system and loss of drilling fluid can be held in a more or less delicate balance. This is particularly important since the most prolific oil wells in the area to date are producing from fractured shale.

Opinions vary as to the optimum water loss of the mud in the area; however, in general it is felt that at this early stage of exploration water loss should be held at a low value to eliminate as much as possible contamination of formations by mud filtrate. In this connection a costly sidetracked hole was drilled in one of the earlier wells because the extent of water contamination could not be ascertained definitely. In some instances the sand content has caused considerable difficulty, particularly in cutting out pumps.

Coring and Testing

It has been demonstrated that the variations in geologic age have had little, if any, apparent effect on average penetration rates except insofar as depth affects these characteristics. The variations do have, however, a very definite bearing on drilling progress as distinguished from penetration rates in that one formation, the Green River, contains such an abundance of hydrocarbon material that coring and testing appreciably retard progress.

As mentioned previously, drill-stem testing accounted for 8 per cent of the total time to date for all of the Tertiary sediments penetrated, Over 80 per cent of the drill-stem tests were conducted in the Green River formation. Some idea of the importance of this factor may be gained by noting that, on an average, one drill-stem test has been taken for roughly each 200 ft. of Green River sediments penetrated to date. The frequent oil shows in the Green River formation have also necessitated the coring of some 15 ft. of each 100 ft. penetrated properly to evaluate prospective producing zones.

Summary

Principal Uinta basin development characteristics to date are summarized as follows:

1. Successful discoveries and indications found in completed dry holes point to the Tertiary fractured dolomitic oil shales of the Uinta basin, Utah, as a significant source of oil.

2. The two wells completed to date in the Roosevelt pool have produced over 350,000 bbl. of oil since the discovery date in June 1949 and are still capable of producing sizable volumes of oil, demonstrating that economically significant oil can be found in this area.

3. With over-all average penetration characteristics of 5 ft. per hour and 50 ft. per bit, the Tertiary sediments in the Uinta basin may be characterized as hard and abrasive compared to other Rocky Mountain drilling.

4. Although considerable improvement in penetration characteristics has been realized to date, primarily by increasing weights on bits to the range of from 20-40,000 lb., it is believed that efficiencies can be further increased and drilling costs reduced.

5. There appears to be a general relationship between penetration rate and depth; with penetration declining on an average of approximately 20 per cent per thousand feet of formation penetrated.

6. An unusually large amount of time and expenditure is required for coring and testing to evaluate potential productive zones.

I.C.I. Wilton Works to Make Terylene

(Continued from page 87)

of a propylene oxide—propylene glycol route analogous to the ethylene oxide process, and development of other processes to take advantage of the simultaneous availability of chlorine and organic chemicals from the cracker.

Utilities.—All the processes at Wilton are carried out at fairly high temperatures, and some at very high pressures. Now that the first stage of development is virtually complete about 500 long tons of coal are used daily in the boiler to produce steam at 900-psi. pressure. Before being sent out into the processing plants the steam is passed through turbo-alternators to generate the bulk of the 30,000 kw. of power required for production. The North-East Electricity Board is meeting the remainder of electricity needs.

For cooling purposes the Tees Valley Water Board is furnishing 42 million gallons of water per week from the Tees River. This water is piped to Wilton works' 6-million-gallon reservoir through 13 miles of main. Other water requirements will amount to 5 million gallons per week of purified water, supplied from the same source, mainly for the boilers.

All the effluent-water drains lead eventually into a main drainage culvert, 7 ft. in diameter, reaching the foreshore at Bran Sands. This large culvert can cope with a daily flow of 90 million gallons. Gas comes from the Northern Gas Board. More than 10 miles of roads and 15 miles of railways have been built on the site.

The 2,000-acre site at Wilton was chosen for the I.C.I.'s petrochemicals project for economic reasons. Plenty of coal, salt, and fresh water supplies are available. Local labor supply is sufficient and there is ample housing available.

A 300-ft. chimney with electrostatic precipitators and cyclones for cleaning waste gases will do much to abate atmospheric pollution. Wilton enjoys, moreover, excellent road and rail communications, while the Tees River has facilities for vessels from small coasters to the largest-size ocean-going cargo liners. A special wharf has been built by the Tees Conservancy Commission for use of deep-sea tankers.

Billingham works.—The Billingham-Wilton tunnel will carry to Billingham several other hydrocarbons produced by the Wilton cracking plant, as also the gasoline, a byproduct of the cracking process. In the reverse direction will flow brine—the raw material for the electroyltic plant producing chlorine and caustic soda. The bulk of the resulting by-product hydrogen will be sent to Billingham, but part will be retained at Wilton for use in the production by an improved process of *a*-naphthylamine for the dyestuffs industry.

The Billingham works, occupying about 1,000 acres on the north bank of the Tees River, produce annually 1,250,000 tons of products vital to national economy ranging from fertilizers to high-grade gasoline. The large hydrogenation plant opened in 1937 produces over 100,000 long tons of gasoline yearly. Since the oil produced by this plant is similar to crude petroleum, it has to be refined. A large section of the plant, therefore, consists of distillation equipment. The process yields a number of valuable byproducts, especially tar acids, which are utilized in the manufacture of plastics, disinfectants, dyestuffs, and medicinal preparations. Another Billingham plant accounts for nearly 10 million pounds per annum of nylon polymer. When the Wilton project is completed early in 1960 the Billingham-Wilton complex promises to be the world's largest chemical unit.

Imperial Chemical Industries.—The merger of four mammoth English concerns—British Dyestuffs Corp., Ltd.; Brunner, Mond & Co., Ltd.; Nobel Industries, Ltd.; and United Alkali, Ltd.—resulted in the birth of the gigantic Imperial Chemical Industries, Ltd. (I.C.I.). This merger which took place in 1926 resulted in the largest industrial enterprise in the British Commonwealth, and the foremost manufacturing undertaking in the United Kingdom, with an issued capital, in round figures, of £85,000,000 ($239,000,000).

I.C.I. operates more than 100 factories strung out over the length and breadth of Great Britain, and employs nearly 100,000 men and women. This personnel is engaged in the production of close to 12,000 different products, ranging from heavy chemicals, petrochemicals, fertilizers, dyestuffs, explosives, paints, and nonferrous metals to medicinal drugs, insecticides and slide fasteners. In 1949 the company's consolidated sales to outside customers totaled £174,600,000 ($665,226,000).

The annual outlay of I.C.I. under research and development exceeds £4,000,000 ($11,200,000) of which £3,000,000 ($8,000,000) are allocated to research. In all, 2,350 chemists and 1,400 engineers are employed. Most of the actual experimental work is done by the principal divisions, which have their own laboratories under the control of a division research director. Each of the larger divisions employs 100 or more persons qualified in research, with several hundred assistants.

All company research is coordinated at the head office by a central research department under the I.C.I. research director. This director exercises general control over expenditure to ensure that due regard is paid by the various divisions to the broader interests of the combine as a whole. The director also coordinates important matters in the vast field of research and brings them to the attention of his colleagues on the I.C.I. board.

BOOKS

EFFECTS OF TAXATION: CORPORATE MERGERS. Ny J. Keith Butters, John Lintner, and William L. Cary. Published by Harvard Business School, Boston. 364 pp. Price $4.25.

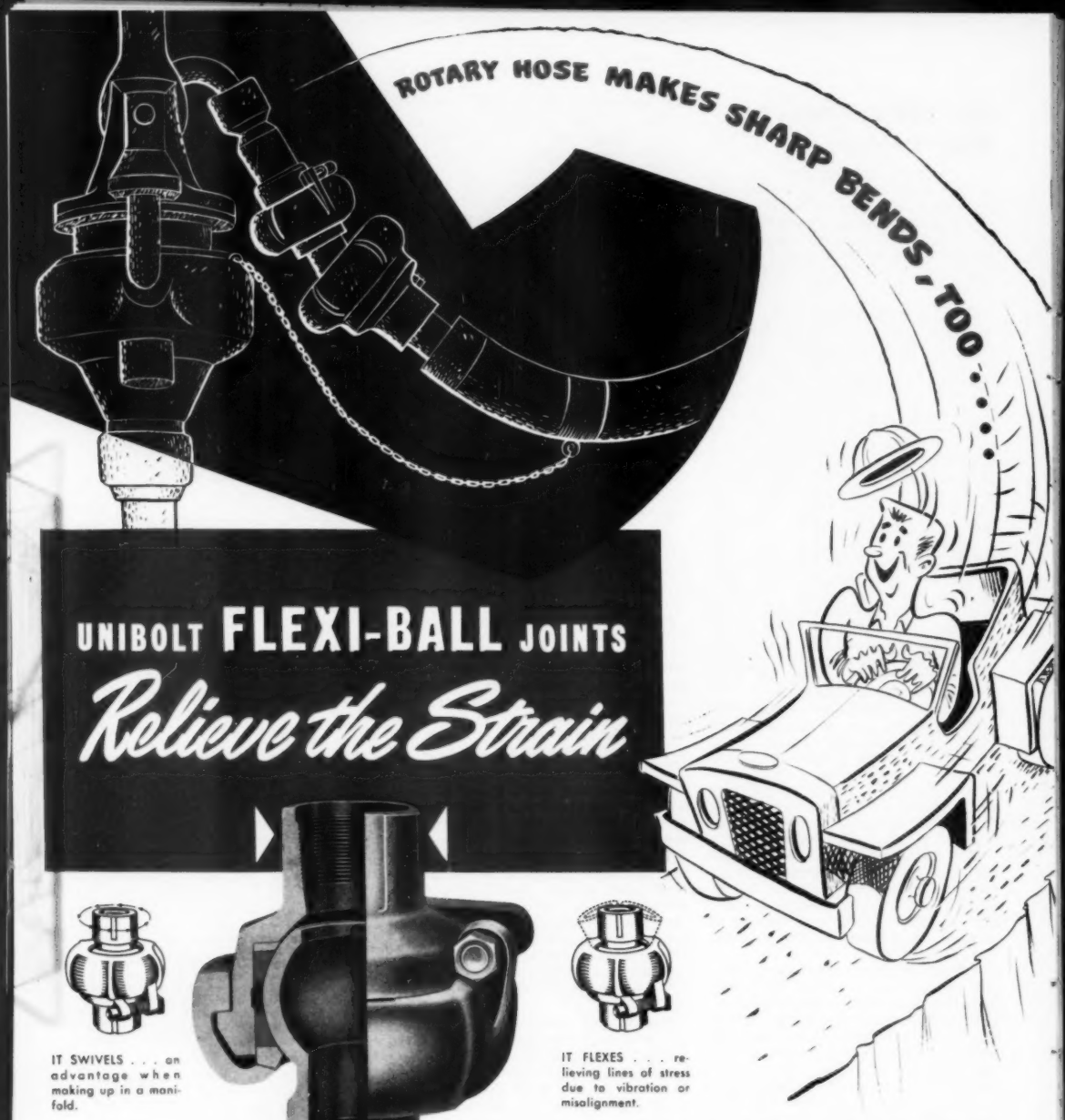
Taxation has been charged repeatedly with the encouragement of industrial concentration and the limiting of competition. However, the influence of taxation on mergers can be appraised accurately only when it is viewed as one of many relevant forces. Accordingly, the objective of this study is to provide an appraisal of the effects of federal taxation on merger activity and on the continued existence as competitive entities of our independently owned small and medium-size companies. The study consists of the following main sections: (1) an analysis of the nature of the tax motivations for the sale of closely held enterprises and of the conditions under which they are likely to exert strong pressure on the owners of such enterprises; (2) a consideration of the alternative courses of action which the owners of closely held enterprises may adopt to avoid selling out to other companies; (3) an appraisal of the relative importance of the tax motivations for the sellers and also the buyers of business enterprises and a consideration of the nontax motivations for sale and purchase; (4) a statistical analysis of the scale and characteristics of the recent merger movement (1940-1947), and (5) an analysis of the effects of taxes on the legal form in which purchases and sales of business enterprises are made.

POSITIVE-DISPLACEMENT PUMPS AND FLUID MOTORS. By Warren E. Wilson. Published by Pitman Publishing Corp., New York. 250 pp.

This book is prepared to satisfy the requirements of two groups of readers; the first includes young graduate engineers entering research, development, or design departments; the second covers more experienced men who need a summary of the available information in a form suitable for ready reference. The book is neither a design handbook nor a complete treatment of the theoretical aspects of positive-displacement machinery; the theoretical treatment is admittedly incomplete since it represents only a first approximation. The development of the theory from basic principles of mechanics follows the modern trend toward the increasing use of a more rigorous approach to the analysis of problems in engineering. The use of dimensionless numbers in the presentation of experimental data and the formulation of equations is also in accord with modern thinking.

LIQUID EXTRACTION, by Robert E. Treybal. Published by McGraw-Hill Book Co., Inc., 330 West Forty-Second Street, New York City. 422 pp. $7.50.

The author, professor of chemical engineering at New York University, covers all phases of liquid extraction in a complete review and organization of the unit operation of liquid-liquid extraction. These include: Physical chemistry of liquid-liquid equilibria, prediction of equilibria, thermodynamics of nonideal solutions, choice of solvents, diffusion in liquids, theoretical discussion of mass transfer, design of extraction systems, description of equipment and operating characteristics, and a brief review of important modern chemical processes using liquid extraction. This book offers a complete coverage of the subject which has previously been unavailable and is unique in its organization, correlation of apparently unrelated data, and detailed references to original sources of information. Flow sheets and equipment diagrammatic illustrations are generously used.



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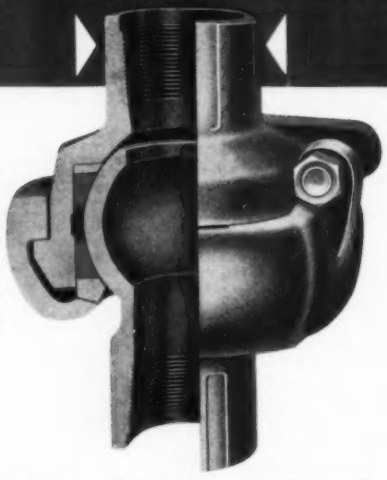

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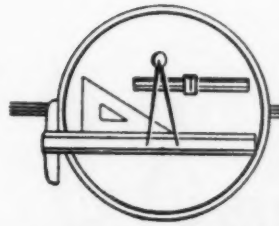

ENGINEERING fundamentals

No. 446

Condensate Reservoirs

THE prediction of performance on a condensate or highly volatile hydrocarbon reservoir has not been accomplished to the same degree as has that for other type reservoirs. Although the analysis of reservoir fluid content combined with a knowledge of equilibrium constants will permit a determination of gross behavior on an equilibrium basis, the approach does not include prediction for nonequilibrium conditions nor the considerations of changing reservoir fluid composition.

Furthermore, the use of basic equilibrium data involves a large amount of analytical work. The possession of empirical methods for estimating performance on such reservoirs is advantageous for instances to which the phase-equilibrium approach cannot apply.

The reservoir containing highly volatile hydrocarbons can be considered as possessing characteristics somewhere between a dry-gas reservoir and a crude-oil reservoir. The dividing lines between these various classifications are, in fact, somewhat arbitrary. As a first approximation one can consider the prediction of behavior on this type of reservoir as a modification of either the gas reservoir treatment or the crude-oil-reservoir treatment. Both of these approaches, as well as that based on equilibrium constants, have appeared in the literature.[1,2,3]

Consider a porous reservoir of unit pore volume, i.e., 1 bbl. of space, for example. Let it be charged with fluid at some pressure p_o. If it be charged with gas only, the production of gas therefrom upon release of pressure will be according to the laws of gas expansion. The ultimate gas produced at a pressure of 1 atm. can be calculated by a direct application of the gas law. The barrels of initial reservoir space per standard cubic foot of produced gas being v_o, the standard cubic feet of gas removed would be $(1/v_o - 5.62)$, or as a very close approximation $1/v_o$. The pressure decline for this reservoir, considering the supercompressibility factor also, is shown in Fig. 1 (see Engineering Fundamentals No. 304).

As an alternative, let the same barrel of reservoir pore space be charged at pressure p_o with an oil having r_o standard cubic feet per stock-tank barrel of gas in solution. Let this gas as produced be identical in nature to that produced from the reservoir having only gas. By the time depletion at 1 atm. is reached, the standard cubic feet of gas production will be r_o/β_i less an amount smaller than 5.62, which is essentially equivalent to r_o/β_i where β_i is the formation volume factor at p_o.

Inasmuch as the value of r_o/β_i will always be less than $1/v_o$ (because more of a given gas can be compressed into a given space if oil is absent) the amount of gas produced by the time pressure has reached atmospheric will be smaller in the case of the oil reservoir than in the case of the gas reservoir. Plotted as comparative pressure declines versus gas production Fig. 1 illustrates the known P/Z linear decline for the gas reservoir and the more rapid decline for the oil reservoir.

The complete gas reservoir represents one limit of pressure decline, that where the original ratio of gas to liquid (surface conditions) is infinity. The other limit, that for a gas-to-liquid ratio of zero would be the y axis. Those reservoirs having gas-oil ratios between zero and infinity must, therefore, lie between these two pressure-decline limits.

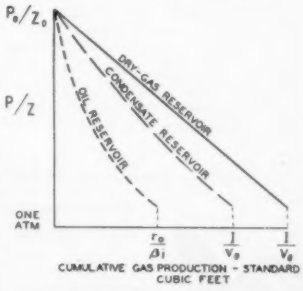

Fig. 1

If the reservoir should be all gas phase but have surface condensable material present, on a cumulative produced-gas basis the decline would be more rapid than the dry-gas reservoir. Consider that the same barrel of pore space is saturated at p_o with gas of composition A (reservoir conditions) which when produced yields gas of composition B (the same as would be possessed by the dry-gas reservoir) plus some liquid fraction. The standard cubic feet of gas produced up to the point of 1 atm. pressure would be $[1/(v_o)_A] - 5.62$ — bbl. liq. $\times V_i$, or approximately $[1/(v_o)_A]$ — bbl. liq. $\times V_i$, where V_i is the gas vaporized (in standard cubic feet) from 1 bbl. of produced liquid.

Since gas A will be more dense than gas B, $(v_o)_A$ will in general be smaller than v_o at a given reservoir pressure and temperature. Therefore, the produced heavier gas volume (standard cubic feet) would be greater than the produced lighter gas volume, but since the basis of comparison must be produced gas of the same composition, condensation of liquid from the heavier gas will reduce the produced-gas volume. The net result will be that the bracket expression which gives produced measurement of gas B will be less than the $1/v_o$ standard cubic feet produced from the dry-gas reservoir having only gas B.

Thus, as a first approximation, the comparison of pressure decline versus cumulative gas production against the pressure decline on an assumed gas reservoir producing the same surface gas from the same size reservoir or against the pressure decline on an assumed oil reservoir producing the same surface gas from the same size reservoir can be an aid in estimating reservoir performance from condensate fields.

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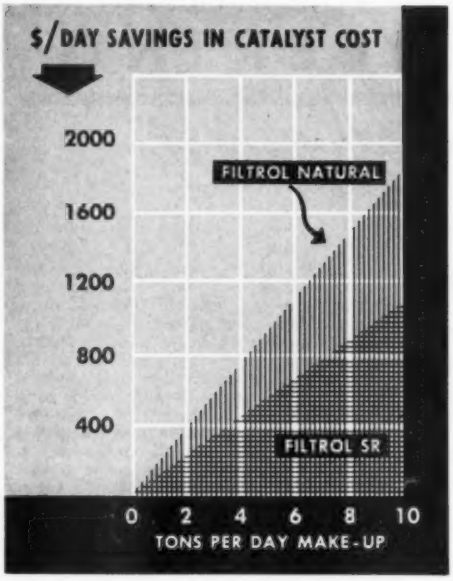
Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, Penn State College



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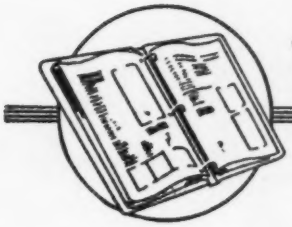

THE REFINER'S notebook

No. 74

Determining Cloud Point of Dark Diesel Oil

by Dr. Y. C. Young*

Part II—Method of Determination of Cloud Point

IN the previous installment the principle and apparatus used to determine the cloud point were described. This second, and concluding, section will study the procedure followed in making actual determinations.

Moisture, if present in the sample, should be removed by any suitable method, such as filtration through a dry filter paper or by filtering through calcium chloride. The time of oil flow is measured in the Vogel-Ossag viscosimeter as described in the previous issue.

The oil is tested from higher to lower temperatures at intervals of about 2° C. The cooling medium is kept as near to the testing temperature as possible. At every testing temperature, the time for the oil to flow through the capillary is measured three or four times. If the cloud point has not been reached these values should be equal. However, when the cloud point is reached, i.e., when the precipitate begins to appear in the oil, the time of the oil flow will then change in succeeding tests even though the testing temperature is held constant. The temperature at which this abnormal change in time of oil flow begins is taken as the cloud point of the oil.

During the experiment, as soon as the abnormal change in the time of oil flow begins, the precipitate in the oil also begins to settle or adsorb on the inner surface of the bulb of the capillary tube, which may be clearly seen through the unsilvered Dewar flask. Moreover, after the abnormal condition begins, the time of oil flow at the same temperature either increases or decreases successively. However, the variation may also be irregular. This apparently depends upon the condition of the precipitate (see Table 1). Any of these phenomena may be taken as an indication that the cloud point has been reached.

The most suitable capillary size of Vogel-Ossag viscosimeter for this determination is that with k = 0.1 to 0.2, where k stands for the constant of the capillary tube in centistoke units (see Table 3). The time required for making a determination with such a capillary is usually about ½ to 1 hour.

From Table 3 it may be seen that the difference between cloud points determined by using different sizes of capillary tubes may be up to 2° C., which is within the limit of accuracy necessary. The capillary with a smaller diameter is more accurate for the determination but takes a longer time, while that with a larger diameter is less accurate. The lower the viscosity of the oil, the smaller the diameter of the capillary that should be used. In general, capillaries of Vogel-Ossag viscosimeter with a constant k = 0.1 to 0.2 are most suitable for this determination.

*The experimental work was carried out in the Institut fuer Mineraloelund Braunkohlenforschung an der Technischen Hochschule, Berlin, Germany.

TABLE 2—COMPARISON OF DIESEL OIL CLOUD POINTS DETERMINED BY THE NEW METHOD WITH THAT BY A.S.T.M. STANDARD METHOD

Origin—	Cloud point, °C. New method	Cloud point, °C. A.S.T.M. method
Fischer-Tropsch synthesis	+ 1.5	+ 1.5
Petroleum	— 9	— 9
	— 6	— 6.5
	—24	—25
	— 6	— 7
	—10	— 8.5
	— 9	—10
	—20	—23
	— 1	— 2
	— 9.5	—10

Conclusion

The determination of the cloud point of dark oils similar to diesel oil may be done as a continuation of the viscosity measurement of the oil in a capillary viscosimeter, but at lower temperatures.

The temperature at which the viscosity of the oil begins to exhibit abnormal behavior is the cloud point.

The cloud points of oils of any color, dark or transparent, may be easily determined by this method.

Acknowledgment

The author wishes to express his appreciation to Dr. G. Egloff, Universal Oil Products Co., Chicago, and to Prof. J. E. Myers, chemical engineering department, Purdue University, Lafayette, Ind.

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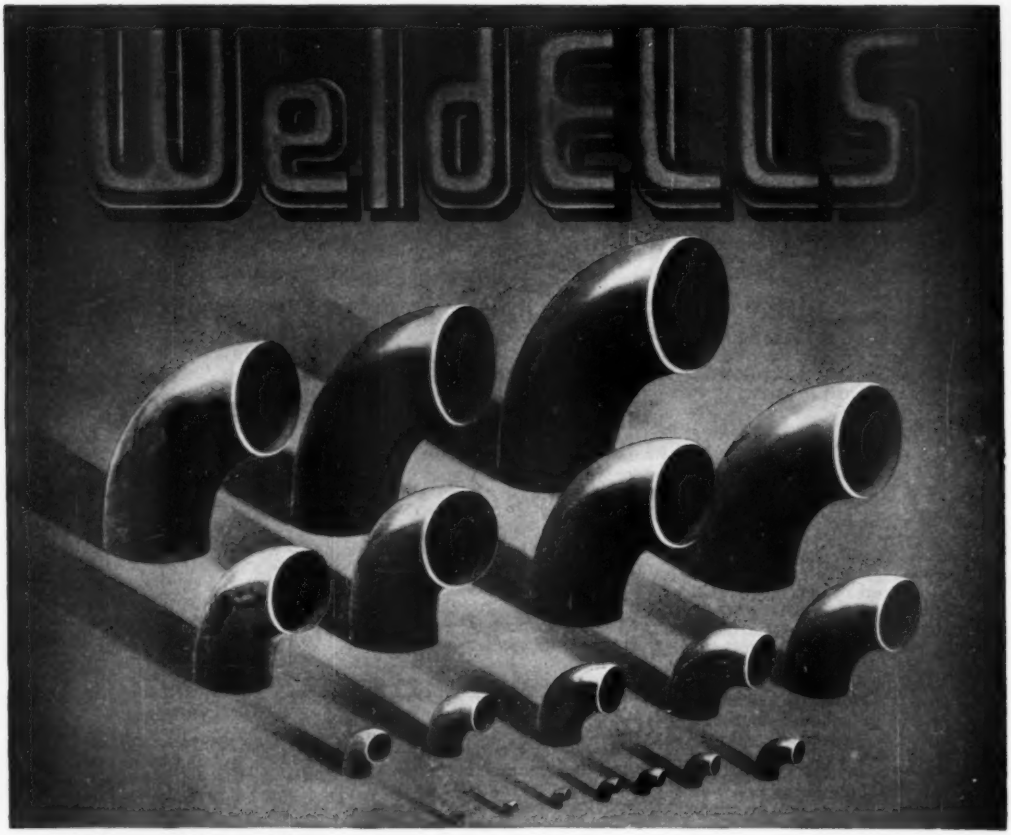
1. Berl-Lunge, Chemische-Technische Untersuchungsmethoden, 8th ed., Vol. 4, 617, Verlag von Julius Springer, Berlin (1933).

TABLE 3—RELATION OF THE CAPILLARY DIAMETER WITH THE CLOUD POINT DETERMINED

Origin—	Viscosity at 20° C. centistokes	Cloud point, °C., when capillary constant k = 0.0207	0.0605	0.0816	0.158	0.221	0.974	1.400
Petroleum	8.84	—6	—6	—6	— 6	— 6	— 6	— 6
Petroleum	2.97	—8	—9	—9	—10	—10	—10	—10



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3 PREFABRICATED PIPING, a two-color, illustrated booklet discusses advances made in the field of high and low-pressure piping subassemblies. It describes and pictures pipe bends, coils, headers, and welded assemblies for petroleum refining, and transmission pipe lines. *The Lummus Co.*

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9 RECIPROCATING PUMP. Data Sheet 64 A is a two-color, six-page bulletin which illustrates and presents features of design, construction, dimension drawings, and performance data of the recently developed Aldrich 3-in. stroke, direct-flow triplex pump. *Aldrich Pump Co.*

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explaining Permolite pigmented organic corrosion-resistant coatings and modes of application. Pictures of various products and equipment protected with Permolite are shown, together with a list of typical applications. *Permolite, Inc.*

11 HEAT TRANSFER SURFACES. Bulletin ID-151 illustrates a wide variety of specialized heat-transfer surfaces developed for industrial products and processes, applicable to such equipment as solvent recovery, intercooling, regeneration, gas separation and liquefaction, and heat economizing and drying. *Modine Manufacturing Co.*

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13 LIQUEFIED GASES. A summary of work with production and handling and storage of liquefied gases is available in booklet form. Included are brief descriptions of the ADL Collins helium cryostat, hydrogen liquefier, liquid-oxygen generator, helium-refrigerator, and liquid-oxygen pump. *Arthur D. Little, Inc.*

14 R/M VEE-FLEX PACKING RINGS, made in five types, are described in an attractive, new four-page bulletin. These rings are recommended for use in valves, pumps, hydraulic cylinders, rams, presses, and lifts against a long list of services and pressures. *Raybestos-Manhattan, Inc.*

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18 CHANNELING ACID is a reprint of a technical paper by P. H. Cardwell, chief chemist of Dowell Incorporated, on the improvement of acidizing process by the formation of channels. The article is liberally illustrated with graphs, diagrams, and pictures of cores showing the results of the channeling method. *Dowell Incorporated.*

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22 SERVICE REGULATORS. Bulletin No. 1026 covers service regulators Types 107 and 183 designed and built for domestic gas service and which operate under high or low pressure on manufactured or natural gas. It also includes construction and performance information, as well as parts lists, accessories, and ordering instructions. *Rockwell Manufacturing Co.*

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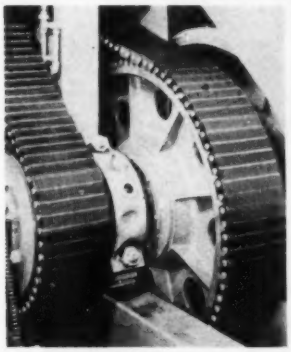
IT'S NEW CHECK IT

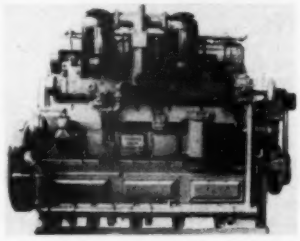
by Dan B. Miller

23 MORSE HY-VO CHAIN DRIVE provides a power-transmitting medium that combines the ruggedness and dependability of a gear drive with the smoothness and lack of vibration of a belt. Hy-Vo makes possible single-drive units capable of transmitting as much as 5,000 hp. at linear speeds up to 6,500 ft. per minute, or rotative speeds up to 3,000 r.p.m. Besides tremendous increases in speeds with much narrower widths than conventional drives, Hy-Vo drives eliminate the need for wide, unwieldly units with costly shaft extensions, outboard bearings, mounts, and other accessories presently required for high-speed engines. *Morse Chain Co.*



IT'S NEW CHECK IT

24 MODEL LR-600-GAS. Designed primarily to take advantage of the plentiful supply of natural gas in oil-producing areas, the new engine is classified in the medium - speed field, because of its 1,100 - r.p.m. rating. Although it will be used principally to provide economical power for oil - well drilling rigs, applications exist wherever there is an abundance of natural gas, such as in pipe-line pumping stations. It is a 6-cylinder, spark-ignition engine, with a displacement of 2,477 cu. in., a bore and stroke of 7¼ by 10, and a maximum rated horsepower of 315. It is equipped with a gas carburetor, mixing valve, magneto, and other special accessories for gas operation. Approximate weight of the engine is 7,500 lb. and it has a compression ratio of 6.8 to 1. *Cummins Engine Co., Inc.*



IT'S NEW CHECK IT

25 MONO-WELD ENGINE JACKET WATER COOLERS. These welded-steel units are more compact and more rugged in construction than their predecessors. Gas and/or lube-oil cooling coils may be mounted between the fan and liquid - cooling core. The blower - type fan cools the cooling coils first, with a minimum rise in air temperature, little affecting the cooling properties of the air flow over the liquid-cooling core. Vertical water flow, heavy-formed, steel-channel, side members, steel side supports for cores, and press-formed, heavy - weight, and nonferrous headers provide a unit capable of resisting vibration and of lasting the life of the engine. *Young Radiator Co.*

IT'S NEW CHECK IT

26 FAST-ACTING TUBE CLEANER FOR HEAT EXCHANGERS. This new tube cleaner, Model TP-301, immediately removes deposits from completely plugged heat-exchanger tubes. Because of its powerful action, it does the job in fewer man-hours. Many improvements have been built into this new tube cleaner. Its weight is 15 lb. It is 13 in. overall and provides increased capacity, from ⅜ up to 3-in. o.d. tubes. Hollow shafting is avail-

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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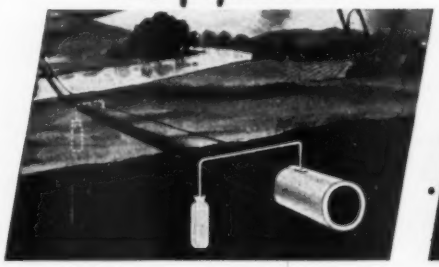
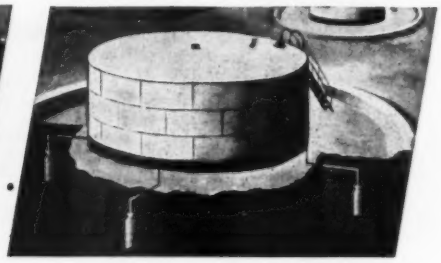
Dowell Magnesium Anodes Cut Corrosion Costs

on pipelines



Thousands of miles of buried pipelines are being protected against corrosion at low cost by Dowell magnesium anodes. Such galvanic protection is proving equally effective on coated, wrapped and bare lines.

on tank bottoms

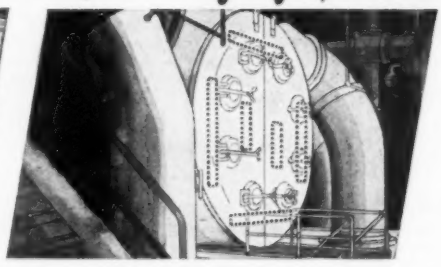


Many firms use Dowell magnesium anodes to prevent the corrosion of the bottoms of large storage tanks. This type of protection is also proving effective for oil lease tanks, gun barrels and completely buried tanks.

on sea water installations

Dowell magnesium anodes are proving satisfactory in controlling corrosion on steel piers, off-shore oil well drilling platforms, ship hulls and other underwater structures.

on operating equipment



The use of magnesium anodes to control corrosion in condensers, heat exchange equipment and many types of processing equipment is gaining wide acceptance.

Galvanic protection with high purity Dowell magnesium anodes has given industry a new way to cut corrosion costs. It has proved effective on a wide variety of installations. A system of Dowell magnesium anodes is easily and economically installed. It requires no external power and only minimum maintenance. Write to Dept. 12, Tulsa for a copy of the free 16-page booklet on galvanic protection with Dowell magnesium anodes.

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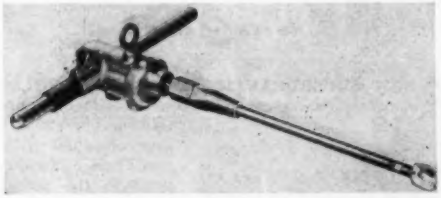
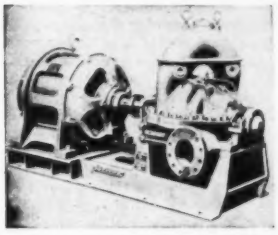
able in one piece up to 20 ft. or in sectional threaded lengths, if desired. Minimum practical working headroom is 5 ft. This positive air-driven, rotary-shaft, drill-



type tool scavenges the tube with air or water while cleaning. It operates on air pressure as low as 50 lb. *Thomas C. Wilson, Inc.*

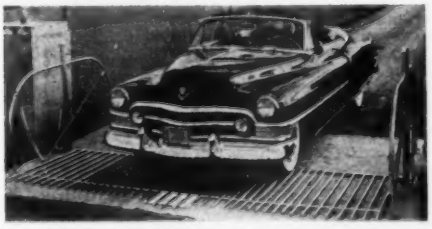
IT'S NEW CHECK IT

27 TYPE DMD HIGH HEAD PUMPS have been improved with regard to compactness, pumping efficiency, and mechanical ruggedness. Pumps are made in sizes from 2 to 10-in. discharge; capacities up to 4,000 g.p.m., and heads to 750 ft. The two-stage design is effective because a single DMD pump, driven by a single motor, produces as much head as two single-stage pumps piped in series. It is an economical unit for rugged service, incorporating many mechanical features to assure long and reliable service. Among outstanding features are: A horizontally split casing with interconnecting passage between the two opposed impellers; the impellers are the nonoverloading type, hydraulically and dynamically balanced at the factory; and the large-diameter shaft is carried on heavy-duty, cartridge-type, dust-proof ball bearings. *Economy Pumps, Inc.*



IT'S NEW CHECK IT

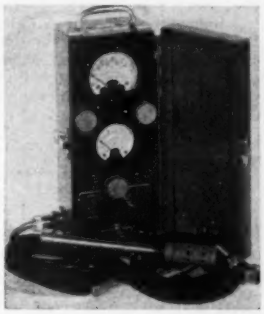
28 PUSH-OVER AUTOMATIC GATE. You never stop at a Push-Over automatic gate, just shift to low gear and keep your car in motion. Your car passes right over it. The gate automatically rises again, back into up-



right position. After front wheels roll over the gate, the hydraulic check holds it flat under the car until the rear wheels have passed. Gate rises a few seconds after car has passed. Can be pushed over from either direction. Livestock cannot operate it. However, it can be braced open to permit their passage. Available in 8, 10, or 12-ft. widths for 10, 12, or 14-ft. fence openings. Ideal for lease gates. *Hawley Manufacturing Co.*

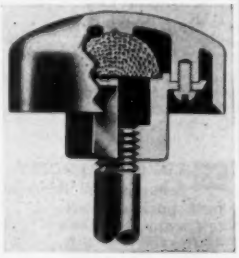
IT'S NEW CHECK IT

29 PORTAGAS PORTABLE GAS INDICATOR for detecting and measuring the hydrocarbons in drilling wells is designed for the geologist for use in drill-stem tests and drilling-fluid sampling. The instrument weighs only 5 lb. Traces of hydrocarbons are accurately, simply, and quickly measured. It may be operated either from the car battery or any 6-volt source. The detecting element is contained within an external probe head attached by a 6-ft. electrical cord to the instrument case. While any hydrocarbons may be detected, the instrument is calibrated on methane gas and readings are instantaneous. Its meter has a Hi-Lo sensitivity range; Hi for low gas percentages and Lo for high gas percentages. Two spare, carefully calibrated extra elements with cord, probe, and battery cords, as well as aspirator bulb, are standard equipment. *Atlas Exploration Co.*



IT'S NEW CHECK IT

30 UNIVERSAL BREATHER VENT TYPE 600. This vent type is designed for installation on regulators having diaphragms in a horizontal plane. Vent connections on the top (or spring case) side of the regulator are provided with female pipe threads, with the tapped opening in a vertical position. Available in ¼ or ½-in. pipe sizes, the vent is made of a weather-resistant aluminum-alloy die casting and is comprised of two sections joined by three screws. Universal recommends installation with the vent on top of a 3-in. nipple to avoid water splash. Use of the internal wire screen, made in a hemispheric shape of No. 16 bronze-mesh wire, is optional. *Universal Controls Corp.*



IT'S NEW CHECK IT

31 HYDRO-SAND BLAST CLEANING MACHINE cleans heat-exchanger bundles effectively and restores a higher percentage of heat-saving efficiency. Weight of the water pounding and rebounding through the bundles with the sand carried along, cleans thoroughly in the deepest crevices. Concentration of cleaning facilities in one small area saves on space, transportation, handling equipment, and manpower. Installation consists of a sealed cleaning room 26 ft. long, 10 ft. wide, and 7½ ft. high, with wide-opening doors at one end through which work enters on a car. Car is equipped

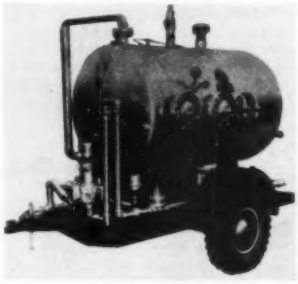
with rollers so work can be rotated during cleaning operations. Windows in three walls provide ample vision. Walls contain rubber-lipped slots running almost the length through which the blast gun passes. Nozzles permit rinsing the lights and windows. Air circulation removes mist and spray. High-pressure stream of water mixed with sand creates blasting force. Sand, water, dirt, and scale pass through perforated floor plates to be reclassified. *Pangborn Corp.*

IT'S NEW CHECK IT

32 FACTORY-PROCESSED TRUCKS. Army surplus trucks that were preserved in government storage are completely disassembled, all preservatives removed, and reassembled to factory specifications. New streamlined cab, hood, and fender assemblies are installed on GMC 6 by 6 as shown. Each truck is sold with a standard new-truck guarantee. The complete line is all-wheel drive and includes International 6 by 6 with 361 cu. in. Red Diamond engine; Diamond-T with 529 cu. in. RXC Hercules engine; NM Mack with 707 cu. in. thermodyne engine; and GMC 6 by 6 with 270 cu. in. GMC engine. All these models have five-speed transmissions and are available with half cabs for crane mounting. *Zeligson Truck & Equipment Co.*

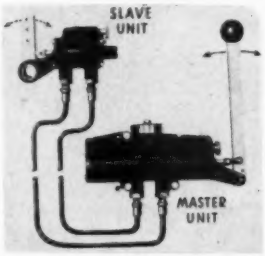
IT'S NEW CHECK IT

33 LARGE-CAPACITY WELLCHECKER. This newly developed Wellchecker, Type No. 1H-4806, is a compact, portable well-testing unit with a 48-in. o.d., a 6-ft. width, and 150-psi. water pressure, horizontal oil and gas separator. It is completely piped with orifice fitting and diaphragm-type back-pressure valve. It also has an automatic free-water knockout feature, by means of which free water is segregated in the water compartment of the separator, its level controlled by a weighted float, and water is metered when discharged from the separator. Additional oil meters may be furnished, manifolded in parallel, to enable the unit to handle high rates of oil flow. Available as either trailer or skid mounted, this large-capacity Wellchecker provides a convenient and accurate method of making periodic well tests, drill-stem tests, potential tests, and tests for determining gas/oil ratios and other essential data. *Rolo Manufacturing Co.*



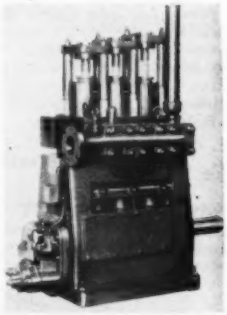
IT'S NEW CHECK IT

34 NEW SUPERDRAULIC REMOTE CONTROL. The complete remote-control system consists of a master unit and a slave unit interconnected by two small tubes. Motion applied to the actuating lever of the master unit is accurately duplicated by the slave-unit lever. It has positive load-carrying ability in both directions because its operation is not dependent upon springs, compressed air, or valves. A primary feature of this control system provides for expansion and contraction of both fluid and metal due to temperature changes in a manner that guarantees synchronization between master and slave units. An automatic lock in the slave lever provides irreversibility. The slave unit is also available without this locking feature. Either unit may be mounted stationary or movable and in any position without affecting the operation. Superdraulic remote control is capable of handling 500 inch-pounds of torque. *Superdraulic Corp.*



IT'S NEW CHECK IT

35 THREE-INCH STROKE DIRECT-FLOW TRIPLEX PUMP. This triplex unit can operate at speeds up to 500 r.p.m., an increase over previous models, resulting in more work from a lighter, more compact pump. Power ranges up to 50 hp., pressures up to 3,800 psi., and displacement up to 96 g.p.m. at 790 psi. and 500 r.p.m. It passes liquid in a straight line, directly through the working barrel. Engineers eliminated two right-angle turns in the fluid-end block, resulting in a reduction of "loss space." Change in plunger size can be readily made to meet alterations in pressure or capacity. *Aldrich Pump Co.*



IT'S NEW CHECK IT

36 ADJUSTABLE FLOW REGULATORS for cylinder-speed control gives a constant rate of flow regardless of pressure fluctuations or change in work resistance at any setting within the adjustable range. Adjustable range is 50 per cent of the calibrated flow rate in gallons per minute. It is available for hydraulic systems with operating pressures to 3,000 psi. Line sizes are ¼, ⅜, ½, and ¾-in. National Pipe Thread (dry seal)). Maximum controlled flow is 16 g.p.m. *Waterman Engineering Co.*

IT'S NEW CHECK IT

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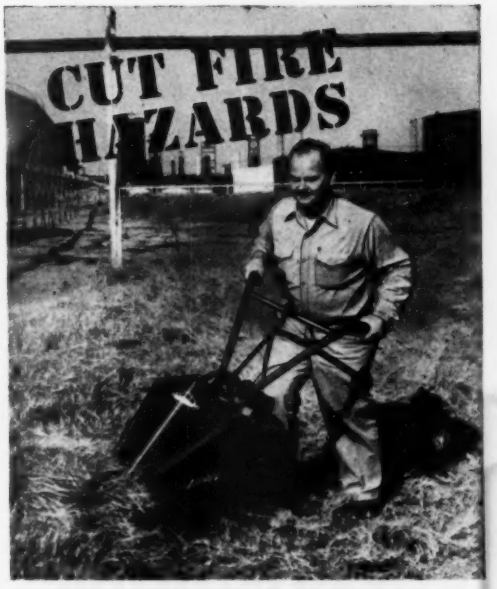

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50 YEARS OF OIL IN THE SOUTHWEST!

The Journal's GOLDEN ANNIVERSARY supplement (May 31, 1951) brings you a comprehensive history of the half-century of oil progress in the colorful Southwest. The story starts with Spindletop and carries forward to today!

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NATURAL GAS

Tennessee Gas Expansion Program Approved by FPC

WASHINGTON. — Tennessee Gas Transmission Co.'s plans to increase daily delivery capacity of its natural-gas transmission system from 1.310 billion to 1.395 billion cubic feet have been o.k.'d by the Federal Power Commission.

The commission also authorized the company to construct necessary facilities for the development of an underground-storage area in Hebron field, Potter County, Pennsylvania, in cooperation with United Natural Gas Co., Oil City, Pa., which would raise capacity another 200 million cubic feet.

Authorized facilities include about 419 miles of 26 and 30-in. loop line along its present system; 142 miles of 24-in. extension; about 200 miles of various diameter lateral lines to be located throughout the system; 54,100 compressor horsepower at existing and previously authorized stations; and 21,120 hp. in a new station at Hebron field.

The commission denied construction by the company of facilities north and east of Hebron field which included 162 miles of new lines, 109 miles of loop line, and 3,000 hp. in additional compressor capacity.

As a result of the construction, Manufacturers Heat & Light Co., Pittsburgh, will receive 25,000,000 cu. ft. of gas per day from Tennessee, and 15,000,000 cu. ft. each will go to Iroquois Gas Corp., Buffalo; Equitable Gas Co., Pittsburgh; and United Natural.

Tennesse plans to use 40,000,000 cu. ft. per day initially to provide a part of a 23.8 billion cubic feet of cushion gas for operation in Hebron field. The cushion is expected to be in the field by the end of 1953. The 40,000,000 cu. ft. will then be made available for other purposes.

Estimated cost of all facilities, including those denied, was $94,869,000. The storage project is expected to cost $7,400,000.

Hearing Called to Stop Flaring in West Texas

AUSTIN.—West Texas oil operators must show cause before the Texas Railroad Commission June 13 why production should not be restricted to prevent gas flaring.

The commission in the hearing notice said that 496,000,000 cu. ft. of gas is being flared every month in Slaughter field of Hockley, Terry, and Cochran counties; 226,998,000 in the TXL, Wheeler, and Fusselman fields of Ector and Winkler counties; about 210,000,000 in Goldsmith field, Ector County; 100,000,000 in University Waddell field, Crane and Ward counties; plus smaller amounts in Fullerton field, Andrews County; McElroy field, Crane and Upton counties; Keyston field, Winkler County; and Seminole field, Gaines County.

Reduction of production in Fulton Beach field, Aransas County, is now being considered by the commission because of gas waste there.

The notice of hearing appears to kick off a new drive by the commission to prevent waste of natural gas in the state. The last crackdown by the commission occurred 3 years ago when 20 fields were ordered shut down for the same reason. Operators managed to secure postponement of action until conservation projects were completed.

El Paso Natural Pushes San Juan Gas Development

FARMINGTON, N. M.—Early development of natural-gas properties acquired in the San Juan basin last year from Delhi Oil Corp., Dallas, is contemplated by El Paso Natural Gas Co.

In July, 1950, Delhi sold its Barker Creek domes leases in Colorado and New Mexico to El Paso Natural for $2,658,658, according to C. W. Murchison, Delhi president. Under terms of the sale, Delhi receives an initial overriding royalty of 5 cents per M.c.f. of all gas produced, 6 cents after the first 5 years of production, and 7 cents after the first 10 years. First gas sales under the new contract are expected late this year, according to Murchison.

More leases were acquired by El Paso in the area last week when the company, along with Continental Oil Co. and Skelly Oil Co., were high bidders at an oil and gas lease sale held by the Ute Mountain and Southern Ute councils at separate meetings at Ignacio, Colo. The sale comprised 37,700 acres of tribal lands near Barker Creek dome in Montezuma County.

Provision for development of the former Delhi leases is part of the revised third major application filed by El Paso Natural with the Federal Power Commission proposing certain construction to enable movement of 100,000 M.c.f. of gas daily from San Juan basin and southern Colorado southwesterly to near Topock, Ariz., for delivery to Pacific Gas & Electric Co.

In addition to drilling gas wells, El Paso plans construction of extensive field gathering systems, measuring and metering equipment, and lease acquisitions.

The company also plans 22.9 miles of 16-in. OD loop line along the 16-in. line from San Juan compressor station to Blanco field, and 28 miles of 16-in. line from Blanco field to the Ignacio area in southern Colorado.

Purification and dehydration plans contemplated include at 6,700 M.c.f. per day addition to San Juan plant, and a 4,200 M.c.f. per day expansion to the Angel Peak dehydration and compressor plant. Enlargement of the San Juan gasoline-absorption plant is scheduled.

Oklahoma Law Provides for Condemnation for Storage

OKLAHOMA CITY.—A bill granting the right of eminent domain to natural-gas companies seeking property for underground gas-storage projects was signed here last week by Gov. Johnston Murray.

Earlier, the senate was told in hearings that the right to condemn was needed because land owners at times cannot be found to negotiate contracts. Proponents of the measure said that it would allow gas companies to develop underground projects to handle summer well output to be stored for winter peak demands.

Public interest and welfare are advanced through underground natural-gas-storage projects in that both residential and industrial consumers are assured a steadier year-around supply. Additional supplies are made available in case of major line breaks. Another advantage is that the gas-well owner is assured a more even rate of take during the summer months when demand is light.

Gas companies believe that the new measure will accelerate the obtaining of a complete blanket on subsurface rights in connection with major construction projects.

Natural Gasoline

Sunray to Get 200 New L.P.G. Tank Cars in June

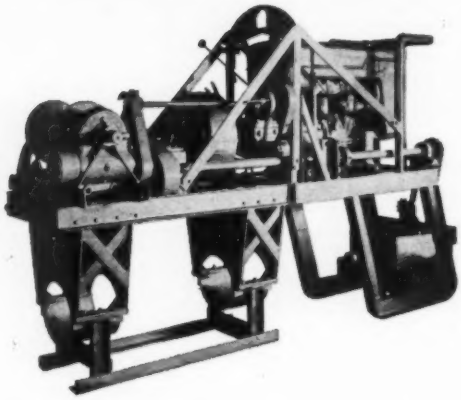
Sunray Oil Corp. will have purchased and received 200 new L.P.G. tank cars and leased 100 more by the middle of June.

Delivery of the new cars will give the company control over shipment of its growing volume of L.P.G. products from its natural-gasoline plants in the Southwest.

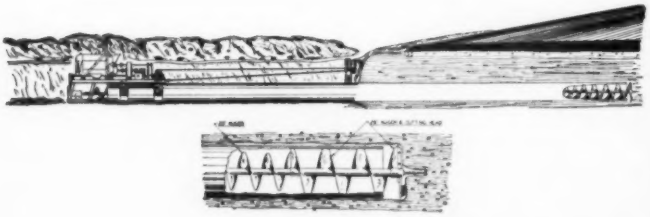
About 100 of the 10,000-gal. cars have already been delivered and are in service. The remainder are being shipped from the factory at a rate of 10 cars each day.

Sunray has production units at Earlsboro, Okla.; Midway, Ark.; Benton and West Tepetate, La.; and numerous points in Texas, including the new Snyder plant in Scurry County.

IS YOUR JOB BORING



CROSE AUGER TYPE ROAD BORING MACHINE installs pipe casing up to and including 34" in diameter. This machine has proven highly satisfactory with Pipe Line Contractors for the fastest method of installing pipe casing where rock is not encountered. Machines for installing casing larger than 34" in diameter are also available.



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PIPE LINES

Early Completion of Platte Line Said to be Essential

DENVER.—Any delay in allocation of steel pipe needed to complete remaining portions of the Platte Pipe Line Co. crude line from Worland, Wyo., to Wood River, Ill., will mean that much delay in producers attempts to reach peak oil output in the Rocky Mountain region, according to Henry S. Phillips, vice president and production chief for Sinclair Oil & Gas Co.

Lack of pipe for a 500-mile stretch of line in Kansas and Nebraska has stalled construction of the 20-in. crude trunk line. Oil from Wyoming, Montana, Nebraska, North Dakota, and Colorado would be carried through the line for distribution in the Midwest and East.

The line has been estimated to cost about $60,000,000. About $3,000,000 had been spent by the middle of May, with more than 40 miles of 16-in. laid from Worland south and pump stations started all along the 1,080-mile route.

By the first of this month, all right-of-way was to have been purchased, all 140 miles of 16-in. laid, and laying of 20-in. started in Missouri. O. R. Burden Construction Corp., with contracts for two sections of the line in Missouri, has reported work under way on the section from Salisbury, Mo., to the Mississippi River. Spreads are now moving in to begin work on the section from the Missouri River to Salisbury.

Texas Gas Presents Case For $45,300,000 Expansion

WASHINGTON.—Texas Gas Transmission Corp. presented evidence last week before the Federal Power Commission in Washington in support of its application for a $45,300,000 expansion of its gas pipe-line system in the Midwest and Appalachian areas.

L. E. Ingham, vice president in charge of operations and engineering for the company, testified Texas Gas has on firm order 600 miles of 26-in. pipe required for the project. He said a substantial portion of the balance of the material needed has been ordered, and that construction could be started within 60 days after FPC approval is received. Initial deliveries through the new facilities could begin early next year.

The expansion was originally announced early last January *(The Oil and Gas Journal, January 11, page 50)*. As now planned, the project includes construction of 189 miles of 26-in. line connecting the company's gas-gathering subsidiaries in southwestern Louisiana with the main line in the northeastern part of the state, and construction of 412 miles of 26-in. along the existing system from Louisiana to northern Kentucky.

A total of 18,580 compressor horsepower, including new stations near Shreveport and Madison, Ind., would be added. Capacity of Texas Gas' system would be increased by some 240,000,000 cu. ft. daily to more than 900,000,000 cu. ft. daily.

Triangle Lets Contract for Arkansas Products Line

Triangle Pipe Line Co. has contracted with Anderson Brothers Corp. for the laying of an 85-mile, 10-in. products line from El Dorado to Arkansas City, Ark., where it will connect with a Mississippi River barge terminal. The Anderson Brothers organization is putting two spreads on the job.

Construction of pump stations at El Dorado, Ingalls, and Monticello, Ark., has been contracted by Gasoline Plant Construction Co.

The new line will have a capacity of 65,000 bbl. per day, and will move products fed from Triangle's existing system from Carthage, Tex., across North Louisiana.

No Affiliation

Harold C. Price, president of H. C. Price Co., of Bartlesville, Okla., has issued the following statement:

"An announcement recently appearing in a number of industrial publications states that a newly organized pipe-line contracting firm 'is in effect a merger of the talents and key personnel' of H. C. Price Co. and another contracting company.

"We wish to definitely state that neither H. C. Price Co., or any of its personnel, has any connection whatsoever with this new company, and it is to correct any such misconception that this statement is being issued."

Pipe-Line Briefs

Gulf Oil Corp. plans construction which, along with links already in operation, will provide a continuous 8 and 10-in. products pipe line from Gulf's Lufkin station in East Texas to Nashville, Tenn. See front news section.

Miami Valley Corp. is completing the 58-mile, 8-in. products line from Dayton to Cincinnati. Construction, begun last year, is under contract to Anderson Brothers Corp.

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N. A. Saigh Co. Was Organized in 1921

N. A. SAIGH CO. was organized by N. A. Saigh in 1921, as an individual, doing business under a trade name. In 1949, N. A. Saigh Co., Inc., was formed. Key personnel have continued with the firm during its operations. During the past 26 years more than 8,000 miles of oil and gas lines have been laid for nearly all of the major companies.

N. A. SAIGH

N. A. SAIGH, JR.

WM. VON PHUL

M. VANDERBOSCH

Projects.—From early diversified operations, including engineering and construction of railroads and irrigation systems, Saigh went to pipe lining in 1927 with the laying of a 56-mile 8-in. San Antonio-New Braunfels-Seguin, Tex., line. Between 1928-32 the firm completed 30 contracts totaling $4,000,000 for Texas Pipe Line Co. During the last 10 years, major projects include all construction work for Memphis Natural Gas Co., and sections of War Emergency Pipelines, Inc.'s, 20-in. line; the original Tennessee Gas Transmission Co. line; and Texas Gas Transmission Co. Engineering and promotional work has been done for Tenessee Gas Transmission, Tennessee Natural Gas Lines, Inc., and East Tennessee Natural Gas Co.

Current operations.—The firm began

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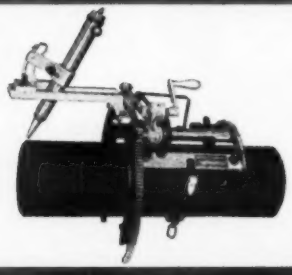
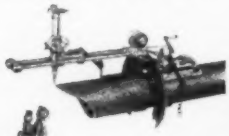


ATTACHMENTS



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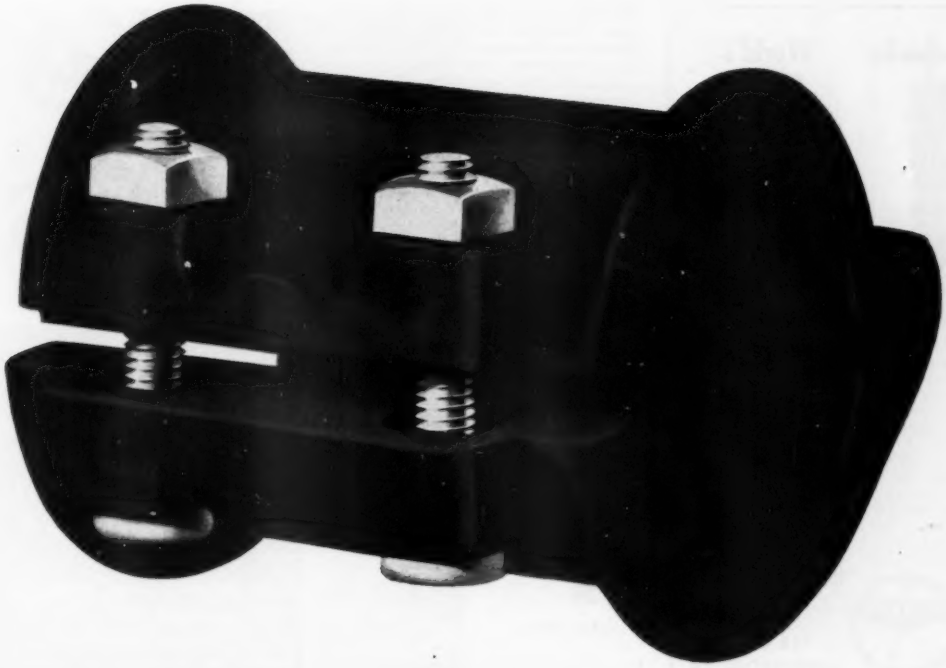

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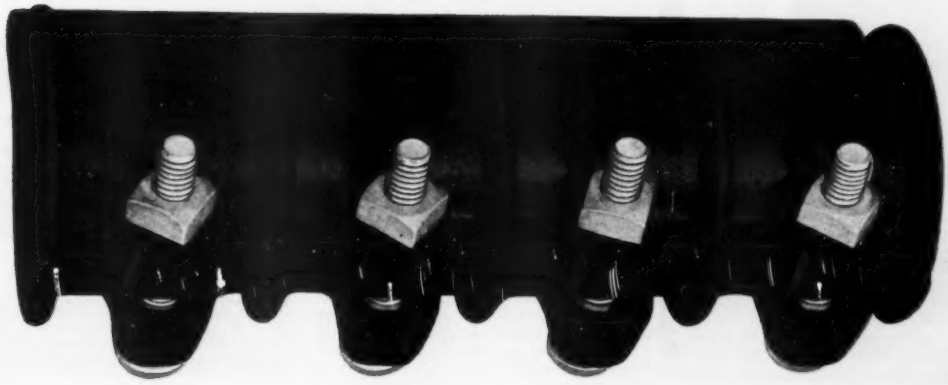

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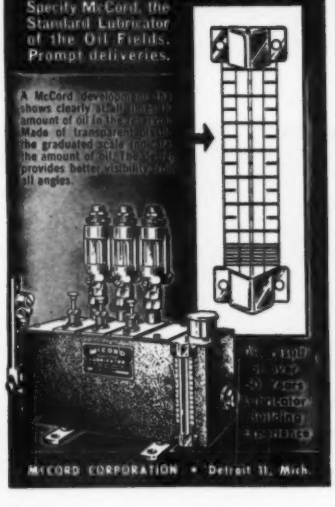

McCORD CORPORATION • Detroit 11, Mich.

1951 operations with a short 10-in. line from Covington to Ripley, Tenn., for Texas Gas Transmission Corp. It has just completed rebuilding all its equipment for early big-inch construction.

Personnel.—N. A. Saigh, president and treasurer, was educated in Chicago high schools and Liberal Arts College, Michigan College of Mines, and University of Wisconsin (civil-engineering degree). In the Quartermaster Corps during World War I, he was engaged in Army camp construction.

R. V. Cartwright was assistant to Saigh from 1923 to retirement in 1950.

N. A. Saigh, Jr., vice president, is now actively associated with the firm. Following Navy service in World War II, he was graduated from Tulane

CARL DOYLE

J. E. GRAY

University in civil engineering and from Wharton School of Finance as Master of Business Administration.

William von Phul, chief engineer, was educated at Tulane and Harvard universities. Formerly he was vice president of Ford, Bacon & Davis Construction Corp. Following discharge as captain in the Navy in World War II he was engineer with Bechtel Corp.

Mildred R. Vanderbosch has been chief auditor and accountant since 1926. James E. Gray is assistant auditor and manager of field offices. Carl Doyle has been general superintendent since 1929. R. E. Floyd has been foreman and assistant superintendent for approximately 20 years.

"Firsts."—Among its accomplishments, several "firsts" may be cited for the Saigh organization: (1) first contractor to use pressure welding, 1942; (2) first to use coating machine with enamel, 1934; (3) first to handle loaded crude-oil pipe lines operating under 800 psi. for Texas Pipe Line Co., 1931.

Saigh participated in building the fastest 12-in. line ever laid—205 miles for Texas Empire Pipe Line Co., laid in 30 days, (1931).

Pipe-Line Briefs

Atlantic Gulf Gas Co.'s application to build 1,731 miles of pipe lines in Louisiana, Mississippi, Alabama, Georgia, South Carolina, and Florida has been denied by the Federal Power Commission.

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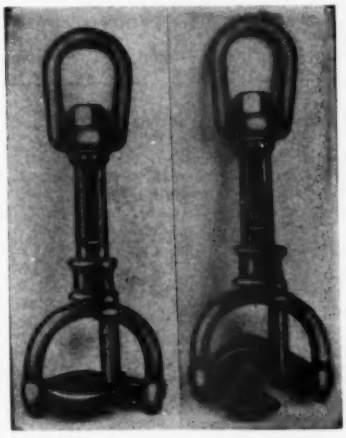

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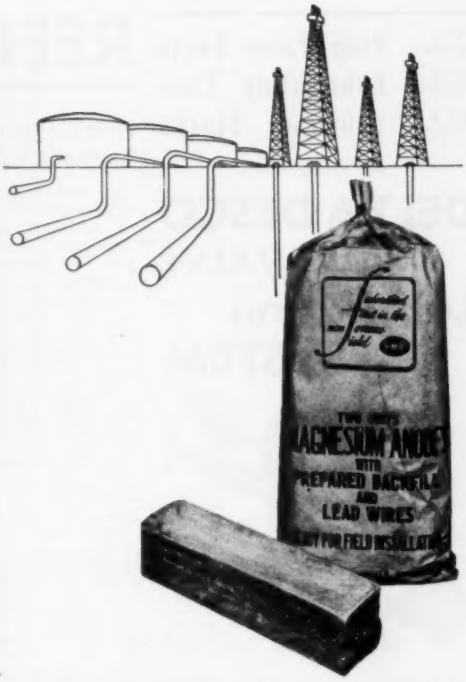

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REFINING

New Catalyst Said to Up Synthetic Rubber Output

A new calcium nickel phosphate catalyst developed by Dow Chemical Co. is said to improve conversion of butylenes to butadiene to such an extent that existing plants, with some modifications, can increase capacity for that synthetic-rubber basic by 50 per cent. Without any plant changes new catalyst will increase throughput by 10 per cent, according to Leland I. Doan, Dow president.

The result of nearly 10 years' research and development, the new pelleted catalyst renders the fixed-bed dehydrogenation process more efficient by affording a 35 per cent or more conversion per pass, and by minimizing the production of light fuel gases from butylene.

Several hundred thousand pounds of the newly patented product have already been shipped to butadiene producers. Prospective users include such companies as Rubber Reserve Corp., Polymer Corp., Humble Oil & Refining Co., and Phillips Petroleum Co.

The 50 per cent increase in existing-plant capacity can be obtained by strengthening the grates supporting the catalyst beds in reactors of dehydrogenation units. This will make it possible to increase feed rates of steam and raw charge stock. According to Dow, this increase can be brought about without adding to feed-preparation facilities.

Moreover, says the company, existing waste-heat-boiler, steam-quenching, and hydrocarbon gas-compression facilities will be adequate at the increased throughput rate, since the new catalyst produces considerably less noncondensible gas than other catalysts now in use. Under such higher throughput rates, however, the butadiene-purification plant would require expansion.

The new catalyst will convert 92 per cent of butylenes to butadiene as compared with a conversion of about 70 per cent with a catalyst previously used. Butadiene, a four-carbon diolefin, is combined with styrene to produce GR-S synthetic rubber.

High-Pressure Lubricant Film Tester Developed

A new advance has been made in the testing of ultra-thin lubricant films under extremely high pressures. The effectiveness of various lubricants can now be determined, at pressures previously impossible to measure with scientific accuracy, by a new method developed at Socony-Vacuum Laboratories, Paulsboro, N. J.

The instrument, perfected by the company's research and development department, can exert measurable pressures up to 250,000 psi. between two metal bearing surfaces.

At given high pressures, the instrument will also evaluate the effect of temperature on the shear strength of a film of grease or oil. Research studies employing the new method have revealed that in some cases temperatures as high as 200° F. have failed to alter the basic shear-strength properties of lubricants.

The apparatus consists of two ¼-in. steel cylinders set at right angles to one another. The horizontal cylin-

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, October.

INDEX (1946 = 100)

	1947	1948	1949	1950	Feb. 1951
Centrifugal pumps	109.0	120.0	118.9	128.1	136.2
Reciprocating pumps	128.5	138.1	144.6	143.9	183.3
Compressor	114.0	128.0	120.0	118.8	138.1
Engines	109.0	120.0	115.6	117.9	137.1
Motors	110.0	112.7	114.0	130.8	148.8
Transformers	116.0	116.0	116.0	116.0	130.5
Instruments	113.0	120.0	122.0	127.8	142.4
Miscellaneous equipment avg.	114.2	122.1	121.6	126.2	145.2
Materials component	122.4	139.3	143.6	149.5	164.4
Labor component	113.5	128.0	137.1	144.0	149.7
Refinery construction index	117.0	132.5	139.7	146.2	155.6

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1951 Oil-Tax Collection Running Above Last Year's

WASHINGTON.—Treasury revenue from the three oil taxes for the current fiscal year may be around $75,000,000 greater than during the fiscal year 1950, judging by receipts for the first 10 months. The total for the year is estimated at some $690,000,000, compared with $615,000,000 actually collected for 1950.

The monthly Internal Revenue Bureau shows that for the first 10 months of the Government's fiscal year $471,339,000 was secured from the tax on gasoline, an increase of $36,374,000 over the $434,965,000 received in the same period a year ago. The lubricating-oil tax returned $80,837,000, an increase of $20,471,000 over last year's $60,366,000, and pipe-line transportation paid $20,505,000, a $4,577,000 increase over $15,926,000 collected in 1950.

Army to Get 300,000 Gal. Of Liquid Synthetic Fuel

WASHINGTON.—The U. S. Bureau of Mines will refine more than 300,000 gal. of high-octane synthetic gasoline from coal for testing in Army trucks and other equipment.

During a 2-month run at the bureau's coal-hydrogenation plant at Louisiana, Mo., 2,600 tons of Kentucky coal was processed into oil at an average yield of 3.7 bbl. of oil per ton of moisture-free coal. The oil will be converted to high-octane gasoline in vapor-phase operations.

Research is part of a program to prove the feasibility of operating commercial plants to make synthetic liquid fuels.

Refining Briefs

Aetna Oil & Refining Co., a subsidiary of Ashland Oil & Refining Co., has announced an expansion program for its Louisville plant estimated to cost $5,000,000. The company said it has applied to the National Production Authority for a certificate of necessity.

Monsanto Chemical Co. has been granted a certificate for the construction of an $8,600,000 styrene plant. Styrene is made from ethylene and benzene.

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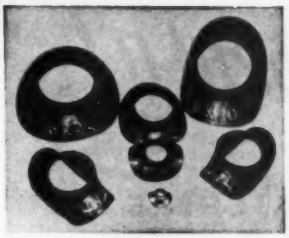

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PIPE SADDLES

Fleetline saddles fit the contour of the pipe . . . have correct wall thickness. They weld neatly into place with much less time and welding rod. Fleetline Saddles are made from welding grade, seamless steel of proper chemical and physical analyses. They do a better, safer, more permanent job at less cost.

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Guiberson Tubing Catchers are offered in two types—Type "E" and Type "B"—with or without anchors.

TYPE "E" is designed for use with 2" tubing in wells up to 11,000 feet deep—and with 2½" tubing in wells up to 8,000 feet. Use of more than one catcher is recommended in wells of greater depth.

TYPE "B" is recommended for use in wells up to 7,200 feet, using 2" tubing or up to 5,000 feet using 2½" tubing.

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TUBING CATCHER ANCHOR

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Among the Drilling Contractors

Number of Active Rigs Declines from Record

Active rotary rigs in the United States and western Canada during the week ended May 28 (latest survey) totaled 2,578, a decline of 40 from the record number of 2,618 reported the previous week. Sharp declines in the number of rigs operating in Oklahoma and Kansas were responsible for the drop in the over-all total. They were attributed to flood conditions existing in many sectors of those states that week. A small decline was reported in the number of active rigs on the Pacific Coast, and in the Illinois basin area drilling continued steady, but in all other areas the number of active rigs increased.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

Area—	Week ended 5-28-51	Change week ended 5-21-51	Change week ended 5-29-50
Gulf Coast	567	+10	+ 51
W. Tex.-N. M.	883	+ 5	+132
Ark.-N. La.-E. Tex.	153	+ 9	+ 20
Oklahoma	256	—36	— 19
Kansas-S. Nebraska	135	—34	+ 9
Illinois-Eastern	157	0	+ 9
Rocky Mountains	142	+ 5	+ 55
Pacific Coast	150	— 7	+ 30
Total United States	2,443	—48	+287
Western Canada	135	+ 8	+ 66
Total	2,578	—40	+353

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Gulf Coast and Arkansas-North Louisiana-East Texas areas are shown by charts on pages 152 and 153.

Arrow Names Bartlett As Manager in Canada

T. P. Bartlett has been made manager, and O. H. Peacock, head toolpusher, for Canadian operations of Arrow Drilling Co. of Dallas and Tulsa. Bartlett has been associated with the company for 16 years. Peacock, a Canadian citizen, was one of the company's first toolpushers in that country. He has had drilling and pushing experience with other companies not only in that country but also in Venezuela and the United States. Headquarters for the company's Canadian operations are at Calgary.

Fleet Drilling Co., Ada, Okla., is drilling for Mazda Oil Corp. at 1 State, SE SE SW 36-28n-1e, 7 miles southwest of Newkirk, Kay County, northern Oklahoma. The test, projected to 4,300 ft., is the operator's third in that area. Another new job for this contractor is a 7,800-ft. test being started for Ashland Oil & Refining Co. at 1 Zurline, C SE NW 16-11n-4w, southwest of Oklahoma City, Oklahoma County.

Pike Drilling Activity Reaches All-Time High

Thomas P. Pike Drilling Co., Los Angeles, currently is operating 17 rigs, the greatest number at any one time in the company's history. Seven of the rigs are in the Placerita field on a drilling contract with Tevis Morrow, Texas and California operator.

Pike Drilling Co. de Mexico, a subsidiary, is drilling below 2,400 ft. on the projected 10,000-ft. wildcat test it is putting down in the San Ignacio area of Baja (Lower) California under contract with Petroleos Mexicanos, the Mexican government's oil agency.

H. J. Uhl Drilling Co., Wichita, has a contract with Aladdin Petroleum Corp. for a test, 1 Oliver, at a wildcat location 5 miles west of the El Dorado field, Butler County, Kansas. Location is in the NE SW SW 19-26-4e.

Davenport Drilling Co. has a ligh rig on a wildcat location south of the shallow Spring pool in southern Jefferson County, Oklahoma, where it is drilling a projected 3,500-ft. test in partnership with C. L. McMahon and W. E. Davis. Location is in the SW SW SE 26-6s-6w, a few miles from the Red River.

Vierson & Cochran, Okmulgee Okla., have a rig working for Republic Natural Gas Co. in the development of the recently opene Misener sand producing area on the north side of the Ingalls pool, Payne County, Oklahoma. Latest contract is for 1 Davis, SW NW NE 26-19n-4e. The pay zone is at depths around 4,000 ft.

Creekmore Drilling Co., Tulsa, is drilling for Deep Rock Oil Corp. at a wildcat location in the SW NW NE 4-8-18, 6 miles northeast of the Webster pool, Rooks County, Kansas.

Lowell & Gist, Denver, have been awarded a contract to deepen an old hole which General Petroleum Co. has taken over on the Manderson structure on the east side of the Big

The man on the rig knows that for a tight seal and easy separation of parts you can't beat 'Bestolife Lead Seal Tool Joint and Casing Compound. Standard of the oil industry for 20 years. Unconditionally guaranteed. Sold and exported by supply houses throughout the world.

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These swivels are all tested to 10,000 lbs. before being shipped.

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105	1⅛"	4⅛	8⅛	40,000
105-A	1⅛"	4¼	8⅛	40,000
106	1¼"	5¼	8½	60,000

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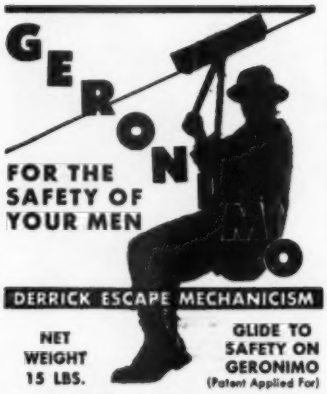

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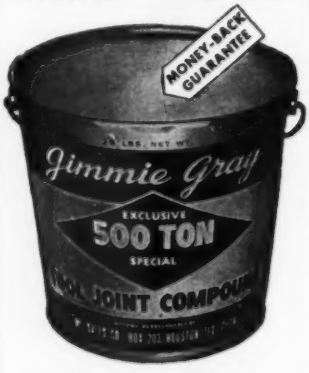

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BOX 203—HOUSTON, TEXAS
Charter 5648

Horn basin, in Big Horn County, Wyoming. The hole, drilled last year by Pioneer Oil Co. to 5,791 ft. will be deepened to the Madison lime, expected around 8,000 ft. The test is 1 West, C SE NW 20-50n-92w.

Aylward Drilling Co., Wichita, is the contractor on a wildcat test which National Cooperative Refinery Association is drilling in the Canyons pool area, Ellis County, Kansas. Location is on the operator's Schmidt lease, in the SE SE SE 14-12-17. It is about a mile south of production.

P. H. & T. W. Bennett, Sapulpa, Okla., are among the contractors now operating in North Dakota. They have a cable-tool rig working for Red River Oil & Developing Co. near Grand Forks.

E. K. Carey Drilling Co., Denver, has a contract with Plains Exploration Co. for a wildcat test in the area south of Yenter, Logan County, Colorado. Location is in the SE SE SW 22-8n-54w. This company also is starting a well for Derby Oil Co. at 1 Burk, SW SW SW 36-15s-4w, in the Smolan area, Saline County, Kansas.

Johnson & Flesher Drilling Co., Oklahoma City, has moved a rig into the North Marshall pool, northwestern Logan County, where it has a contract for a well to be drilled for Coronet Construction Co. Location is for 1 Ficken, in the SE SE NE 8-19n-4w.

McConnell Drilling Co., Farmington, N. M., has a rig on a wildcat test being drilled for Frontier Refining Co. in the area between the Kutz Canon and West Kutz Canon gas fields in San Juan County, northeastern New Mexico. The operation is 1 Evensen-Government, SE NW SE 19-27n-10w.

Paul Hamner, Duncan, Okla., is starting a projected 3,000-ft. test 9 miles west of Duncan, Stephens County, Oklahoma, on a contract with Clark C. Nye and Vickers Petroleum C. The test is the operators' 1 Tovettry, NE SE NW 14-1s-9w.

B. F. Allison Drilling Co., Casper, Wyo., has moved a rotary rig to the North Alkali Butte area, about 8 miles east of the Riverton Dome, Fremont County, Wyoming, where it will drill for Atlantic Refining Co. at 2-A Tribal, SW SE SE 29-1s-6e.

Fitzpatrick Drilling Co., Inc., Casper, Wyo., has a rig running in the East Sterling area, Logan County, Colorado, where it is drilling for Sohio Petroleum Co. at 1 State, NW SE SE 24-8n-51w.

Puckett Drilling Co., Tulsa, has a contract for a Cromwell sand test to be drilled for Arthur Finston in the extreme northern part of Seminole County, Oklahoma. Location is on the operator's Grimes lease in the NE NE NW 29-11n-7e, just south of the Okfuskee County line. Projected depth is 4,000 ft.

Geir & Jackson, Dallas, are the contractors on a projected 10,000-ft. test which Vickers Petroleum Co. is starting in northeastern Kiowa County, southwestern Oklahoma. The location is on Indian land in the C NW NE 8-7n-14w.

Colorado - Wyoming Drilling Co. is the contractor on a wildcat test started by R. W. Holt in the Fort Morgan area, Logan County, Colorado. The new venture is 1 fee, with location in the C NE NE 11-3n-59w.

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NO-SMOKE

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Stands the gaff and gets the job done without scoring brake rims. See page 3608-3613, Composite Catalog.

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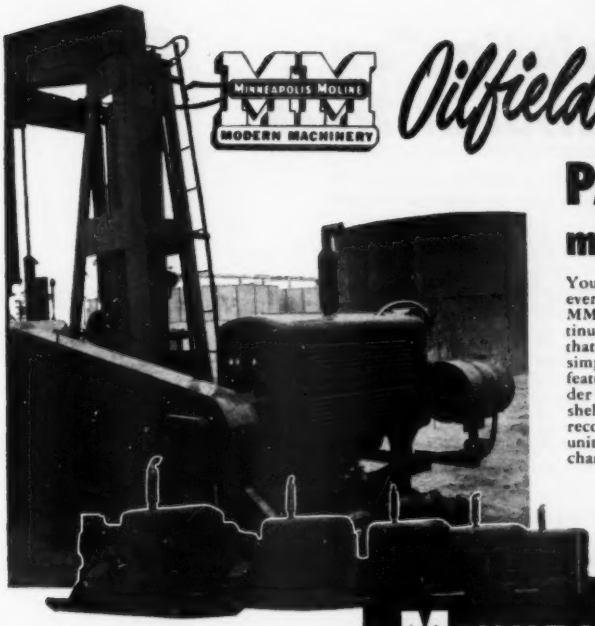

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   You can take that record as proof of longer truck life and the kind of job performance that means lower operating and maintenance costs.

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See the new

INTERNATIONAL TRUCKS

Every model heavy-duty engineered for the long haul

West Texans Attack New Area

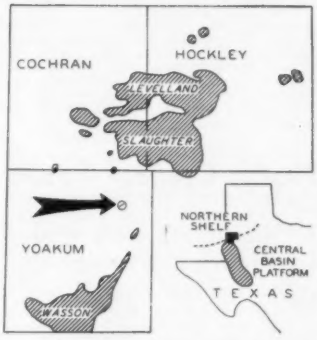
AS has been the case in West Texas since the discovery of pre-Permian production on the Central Basin platform in the early forties, operators no sooner get development started in one deep area than they are off to open another.

Right now the shift of exploratory interest is to the long-neglected pre-Permian beds on the Northern shelf. For the first time there is a sufficient number of deep wildcats attacking this area to give the key to what its actual potentialities are.

The little that is known about the deep rocks on the Northern shelf indicates that the area has all of the regional-geological earmarks needed to produce great oil fields. It is structurally and stratigraphically similar to the prolific Central platform and, like the Central platform, has large Permian fields developed on its edge terraces. The Northern shelf offers still another possibility—that of stratigraphic traps. Somewhere between the Central platform area and the Matador archipelago, which stretches east-west across the base of the Texas Panhandle, the pre-Permian beds wedge out. Though the currently drilling wildcats on the Northern shelf are located on difficult-to-interpret seismic structures, some stand the chance of picking up saturated wedge edges of pre-Permian beds.

The current attack on the pre-Permian rocks of the Northern shelf area has been building up for several years. Just across the Texas line in Lea County, New Mexico, the now-developing Denton and Gladiola fields with their hundreds of feet of porous Devonian rocks, are considered excellent indications of what the shelf may yield in the Texas portion. Other indications of the area's potentialities are the small Devonian fields spotted along the extreme southern edge of the shelf in northwest Gaines County, and Landon-Devonian field on the line between Cochran and Yoakum counties. None of these Texas fields show signs of being very large, but they do prove porosity development in the Devonian on the Texas shelf.

For the past few months the major portion of activity has centered in Yoakum County, where at the present time six deep wildcats projected to the Devonian are being drilled.



Probably the most interesting of these tests to date from a geological standpoint is Star Oil Co. et al 1-A Taylor Heirs (arrowed on map), 10 miles northeast of Plains and about 6 miles north of Cobb-Permian field, discovered a year ago last April by Honolulu Oil Corp.

Honolulu's well was drilled to a total depth of 11,661 ft., 85 ft. into the Mississippian section. This well cut a normal Midland basin section of black shales and limestones in the Pennsylvanian series. Star's well, which is currently fishing for rock-bit cones at 11,806 ft., though running only 20-30 ft. higher than Honolulu's well, has encountered a typical platform section, showing mostly limestone through both the Permian and Pennsylvanian, with small red and green shale breaks instead of the normal black shales found in the basin. This would indicate that the extreme southeastern edge of the North Basin platform lies somewhere within the short distance between the Honolulu well and the Star well.

No commercial shows were logged in the Pennsylvanian section cut by Star's well. The top of the Mississippian was called at 11,562 ft., but no porosity was indicated until 11,800 ft., just prior to developing the fishing job now in progress. From 11,800 ft. to the bottom of the hole at 11,806 ft., cuttings revealed fairly good fluorescence, with stain and odor. As soon as the fishing job has been cleared, additional hole will be cut and a drill-stem test run to evaluate the section of porosity encountered. Star plans to carry the hole down to test the Devonian expected at approximately 12,300 ft. *Philip C. Ingalls.*

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Amerada Petroleum Co. has announced location for two new wildcats in western North Dakota, and tested some oil-cut mud and water in a lower zone at the 1 Iverson, recent Beaver Lodge discovery. Continental Oil Co. 59 Unit, Tensleep discovery at Sussex, Wyoming, flowed 250 bbl. of oil in 4 hours through choke on test, and testing is continuing.

WEST TEXAS.—Three miles southeast of Driver field, El Capitan 1 Whitehouse found top of the Spraberry at 6,952 ft., on elevation of 2,731 ft., and was reported to be drilling ahead with cable tools, with 3,500 ft. of oil in the hole. Wilshire Oil Co. 23-129 McElroy Ranch, northwest offset to Sinclair's discovery, flowed oil on a drill-stem test of the Pennsylvanian between 9,290-9,345 ft.

MISSISSIPPI.—Continental Oil Co. is testing sour gas from the Smackover at 1 John R. Cameron, 36-10n-1e, Madison County. Top of Smackover was encountered at 13,717 ft. and first lime at 13,825 ft. Well is testing from open hole below casing, which is set at 13,783 ft.

NEW MEXICO.—Magnolia Petroleum Co.'s wildcat in Roosevelt County gaged 103 bbl. of 47.8°-gravity oil in 15 hours through ¼-in. choke after acidization of the Permo-Pennsylvanian.

Kansas

Oil Showings Found in Norton County Wildcat

PEEL & HARDMAN are preparing to test promising oil showings encountered in their 1 Allen, SW SW SW 11-5-24, a rank wildcat in southwestern Norton County, northwestern Kansas. Showings were in the Lansing-Kansas City section with Lansing topped at 3,393 ft. (—1,140 ft.). Casing has been run through the section, base of which was logged at 3,589 ft. Hole was drilled to 3,835 ft. in Arbuckle lime, topped at 3,748 ft.

A 60-minute drill-stem test of an interval at 3,437-52 ft. yielded 70 ft. of oil-cut mud. A 15-minute test lower in the section at 3,532-45 ft. got 2 ft. of free oil and 7 ft. of oil-cut mud. Indicated bottom-hole pressure was 740 psi.

Location of the wildcat is about 20 miles northwest of the Ray area, nearest production on the Norton-Phillips County line at the northwestern end of the Central Kansas Uplift trend of pools.

Discovery of another Mississippi dolomite pool in eastern Kingman County, near the Sedgwick County line, is indicated by showings encountered by Bankoff Oil Co. 1 Dieffenbacher, SW SW SW 22-27-5. The well sprayed oil with gas in a test of that zone, topped at 3,801 ft. and drilled to 3,818 ft. Casing has been run 1 ft. in the pay for completion. The well had the top of the Mississippi chert at 3,761 ft. Location is about 3 miles west of the Bartholomew pool.

Atlantic Refining Co. recovered 60 ft. of mud-cut oil and 75 ft. of heavily oil and gas-cut mud following a 60-minute drill-stem test at 3,183-92 ft. in Lansing lime, topped at 3,160 ft. (—1,396 ft.) in its 1 Sankey, NW NW NW 22-22-10, Reno County wildcat. The well is 4 miles northwest of nearest production in the Zenith-Peace Creek field.

In the same county, another wildcat, Earl Wakefield 1 Goering, SE SE SE 14-25-6, 5 miles north of the North Albion pool, nearest production, recovered 45 ft. of oil and 35 ft. of heavily oil-cut mud in a 90-minute drill-stem test of an interval at 3,875-85 ft. in the Mississippian. Top of the Mississippian was logged at 3,484 ft. Lansing was cut at 2,795 ft.

Lewis Drilling Co. has completed its 1 Schroeder, NE NE NE 10-18-9, northern Rice County, as a 50-bbl. pumper in the conglomerate zone to open a new producing area 1½ miles northeast of the Guldner pool. Production is from casing perforations at 3,241-67 ft. with top of the zone at 3,213 ft. Hole had been drilled to 3,336 ft. in Arbuckle lime, topped at 3,286 ft.

KANSAS SUCCESSFUL WILDCATS

Meade County: Columbian-United 1 Novinger, C NW NW 26-33s-30w, flowed 1,675 bbl. oil from Marmaton at 5,270-90 ft., TD 6,637 ft., Lansing-Kansas City 4,575 ft., Mississippi lime 5,835 ft.

Skelly 1 Goodnight, SW SW NE 3-34s-26w, flowed 7,000,000 cu. ft. gas from Mississippi lime at 5,787-5,891 ft., TD 6,123 ft., Heebner 4,439 ft., Lansing-Kansas City 4,603 ft., Meramec 6,063 ft., St. Genevieve 6,116 ft.

Rooks County: Derby et al., 1 Rogers "A," SW SW SW 22-10s-20w, pumped 199 bbl. oil from Arbuckle at 3,720-26 ft., TD; Heebner 3,376 ft., Lansing-Kansas City 3,418 ft., cherty Sooy 3,662 ft., Simpson 3,701 ft.

Sedgwick County: Allison 1 Faulk, SE SW SE 11-27s-2e, flowed 144 bbl. oil from Arbuckle at 3,247-51 ft., TD 3,288 ft., Kansas City 2,386 ft., Mississippi lime 2,860 ft., Kinderhook 3,100 (?) ft., Viola 3,137 (?) ft., Simpson dolomite 3,157 ft.

KANSAS WILDCAT FAILURES

Barton County: Gear 1 Dietz, NW NW SW 21-16s-15w, dry, TD 3,665 ft.

ElDorado 1 Schenk, NW NW SW 29-17s-14w, dry, TD 3,430 ft.

Cowley County: Shawver 1 Peck, SE SE NE 9-35s-4e, dry, TD 3,380 ft.

Ellis County: GMR 1 Gassoway, SE SE NE 12-11s-19w, dry, TD 3,592 ft.

Graham County: Gore 1 Moore, NE NE NE 15-7s-25w, dry, TD 4,275 ft.

Harvey County: Hinton 1 Bunnell, SE SW SW 33-24s-2e, dry, TD 3,475 ft.

Marion County: Derby 1 Boettcher, NE NW SW 11-19s-4e, dry, TD 2,370 ft.

McPherson County: Hartman 1 John, SW SW NE 29-20s-1w, dry, TD 3,578 ft.

Nemaha County: Calhoun 1 Nightengale, NE SE SW 16-4s-12e, dry, TD 808 ft.

Phillips County: Westgate-Greenland 1 Seeger, NW NW SE 35-4s-19w, dry, TD 3,551 ft.

Rice County: Black Cat 1 Price, NE NE SW 28-21s-10w, dry, TD 3,525 ft.

Rooks County: Deep Rock 1 Hinkhouse, NW NW NW 26-8s-20w, dry, TD 3,582 ft. Alyward 1 Tucker, SE SE NE 14-10s-17w, dry, TD 3,600 ft.

Russell County: Glickman 1 Gernon, NW NE NE 18-13s-15w, dry, TD 3,355 ft.

Scott County: Amerada 1 Petrzelka, NE NE NE 5-18s-32w, dry, TD 4,140 ft., Wellington 2,603 ft., Herrington 2,766 ft., Krider 2,809 ft., Woodford 2,861 ft., Ft. Riley 2,901 ft., Lansing-Kansas City 3,966 ft.

North Central Texas

Throckmorton County Wildcat Completed in Mississippian

WICHITA FALLS.—Warren Oil Corp. 2 Robinson, 6 miles northeast of Woodson, has been completed as a Mississippian discovery for Throckmorton County and was named the John Anderson field.

Completion potential was 236 bbl. of 42°-gravity oil a day, plus some water, through 16/64-in. choke from pay at 4,540-60 ft. Location is northeast of the recent Malcolm Caddo discovery.

A confirmation failure for the new 154 SMS Caddo field of west Throckmorton County has been reported at Cities Service Oil Co. and Sinclair Oil & Gas Co. 2-154 SMS Ranch, southwest offset to the discovery. Total depth was 5,750 ft. Formation tops had not been released.

Frankirk Ellenburger field of Stonewall County, 7 miles south of Aspermont, has been extended by Ohio Oil Co. 2-A Anderson, which also had prospects of establishing two new producing zones for the field.

Completion potential of the extension well was 220 bbl. of oil a day, based on a 6-hour flow of 64.88 bbl. through ¼-in. tubing choke. Production was from open hole between 5,940-6,001 ft., total depth.

New pay possibilities were in the Canyon sand and Pennsylvanian reef where good shows were encountered.

NORTH CENTRAL TEXAS (DISTRICTS 9 and 7-B) SUCCESSFUL WILDCATS

Archer County: Mummert & Holmes 1 Wilson Properties, 94-3-ATNCL, 8 mi. S Mankins, TD 1,543 ft., pay 1,541 ft., pumped 86.5 bbl. 37°-gravity oil.

Callahan County: McElroy Ranch Co. 2 J. Russell Hart, Sec. 61, LAL Sur., 8 mi. NW Putnam, TD 693 ft., pumped 19 bbl. 30°-gravity oil.

Fisher County: Kadane & Sons 1-A Carriker, R. H. Hibbit Sur. 331, 1 mi. SE Royston, TD 5,854 ft., elev. 1,926 ft., Ellenburger 5,808 ft., pumped 140 bbl. 42°-gravity oil.

Lion Oil Co. 1 R. Allen, 16-1-HT&B, 3 mi. SE Roby, TD 3,581 ft., elev. 2,000 ft., Flippen 3,476 ft., perf. 3,522-44 ft., pumped 140 bbl. 42-gravity oil.

Eastland County: R. D. Snyder 1 V. W. Chambliss, Lot 48, McLennan CSL, 6 mi. E Eastland, TD 1,576 ft., pay 1,532 ft., pumped 42 bbl.

Haskell County: Humble Oil & Refining Co. 1 Clyde Grice, Coryell CSL, 5 mi. NE Sagerton, TD 6,100 ft., elev. 1,585 ft., shot 5,404-32 ft., pumped 26.5 bbl. 40°-gravity oil.

Jack County: L. T. Burns 1 A. T. Singleton, M. Rockerfellow Sur., 2 mi. NW Antelope, TD 3,030 ft., pay 3,024 ft., flowed 125 bbl. 42°-gravity oil, 16/64-in. choke, TP 110 psi., GOR 480 cu. ft.

Star Oil Co. 1 W. E. Ruth, SPRR Sur. 2, 5 mi. SE Bryson, TD 4,493 ft., elev. 1,126 ft., conglomerate pay 4,474 ft., flowed 143 bbl. oil, TP 75 psi., GOR 500 cu. ft.

Palo Pinto County: Ernest Loyd 1 R. H. Gauldin, Sec. 1,739, TE&L Sur., 5½ mi. NW Graford, TD 1,469 ft., pay 1,464 ft., 6 bbl. 39°-gravity oil.

Parker County: Kingwood Oil Co. 1 Scott Woody, T&P Sur. 121, 3 mi. NW Carterville, TD 3,630 ft., pay 2,852 ft., 5,600,000 cu. ft. gas, SIP 1,000 psi.

Shackelford County: M. Z. Dibble 1 G. R. Davis, 9-13-T&P, 15 mi. W Albany, TD 1,621 ft., pay 1,606 ft., pumped 30 bbl. 38°-gravity oil.

Stonewall County: DeSoto Oil Co. 1 V. B. Bullard, 129-D-H&TC, 1½ mi. S Aspermont, TD 5,550 ft., elev. 1,771 ft., pay 4,890 ft., perf. 4,888-4,920 ft., flowed 419 bbl. 41°-gravity oil, ¾-in. choke, GOR 500 cu. ft., TP 60 psi.

C. L. Norsworthy 1 T. A. Upshaw, 84-D-H&TC, 2½ mi. NE Aspermont, TD 6,110 ft., Caddo 5,955 ft., perf. 5,945-70 ft., flowed 147 bbl. oil, 13/64-in. choke.

Wilbarger County: Gray Oil Co. 1-D W. T. Waggoner, H&TC Sur., 10 mi. SW Electra, TD 1,839 ft., pay 1,836 ft., 3 bbl. oil.

NORTH CENTRAL TEXAS (DISTRICTS 9 and 7-B) WILDCAT FAILURES

Archer County: J. W. Hawley 1-B W. H. Taylor, Blk. 15, ATNCL, dry, TD 1,600 ft.

G. E. Kadane & Sons 1 Stinnett, A. Hunley Sur., dry, TD 3,515 ft.

Frank Wood et al., 1 J. Conrady, Blk. 4, Clark & Plumb Sur., dry, TD 3,834 ft.

Baylor County: R. W. Darden Trust 1 R. Harmel, Sec. 2,458, TE&L, dry, TD 1,575 ft.

C. W. Walker 1 W. L. Barnes, H. J. Hamon Sur., A-155, dry, TD 2,010 ft.

Brown County: Bankline Oil Co. 1 V. M. Greenwood, Sec. 283, S. Jones Sur., dry, TD 1,652 ft., elev. 1,687 ft., Cross Cut sand 1,592 ft.

McLean-Roberts 1-A Cox & McInnis, Sec. 28, Louis Merchand Sur., 7 mi. NW Brownwood, dry, TD 2,356 ft., elev. 1,411 ft., Caddo 1,359 ft.

Clay County: Hull Oil Co. 1 Guy Harding, Sec. 131, M. Lassiter Sur., dry, TD 2,262 ft.

Frank Wood 1 Clay Dunn, Blk. 84, Byers Bros. Subd., dry, TD 1,410 ft.

Coleman County: E. G. Redman et al., 1 Straach, W. E. Dundas Sur. 673, dry, TD 2,753 ft., elev. 1,816 ft., Brenecke 2,345 ft.

Cooke County: Broday Drilling Co. 1 C. F. Potter, J. Clark Sur., A-225, dry, TD 2,513 ft.

McCarty & Coleman 1 B. S. Wadlington, B. Lusk Sur., dry, TD 2,145 ft., Ellenburger 2,062 ft.

J. R. and Adam Seitz 1 E. A. Stanley, S. E. Clement Sur., dry, TD 3,125 ft.

Eastland County: A. T. Jergins 1 J. A. Beard, 13-4-H&TC, dry, TD 3,671 ft.

S. D. Johnson 1 O. C. Holcomb, John House Sur., dry, TD 3,454 ft.

Fisher County: Twin Oil Co. 1 O. Terry, 262-3-H&TC, dry, TD 6,739 ft., King 4,095 ft., Swastika 4,287 ft., Canyon 5,307 ft.

Foard County: Hunt Oil Co. 1 W. B. Johnson, A-11-SPRR, dry, TD 7,450 ft., in Ellenburger.

Haskell County: Eastland Oil Co. 1 R. Y. Mobley, 23-1-H&TC, dry, TD 5,020 ft.

Jones County: Ralph Harper 1 Rex Smith, 3-17-T&P, dry, TD 2,765 ft.

Palo Pinto County: Barney Carter 1 C. G. Peach, 40-2-T&P, dry, TD 1,644 ft.

Ernest Loyd 3 R. A. Gauldin, Sec. 1,739 TE&L Sur., dry, TD 1,549 ft.

W. H. and J. T. Snider 2 C. Chaney, SPRR Sur., dry, TD 1,417 ft.

Shackelford County: American Liberty Oil Co. 1 Manley Bros., 41-14-T&P, dry, TD 5,012 ft., elev. 1,712 ft., Strawn 3,417 ft., Caddo 4,440 ft., Mississippian 4,752 ft., Ellenburger 4,844 ft.

Taylor County: Tex-Harvey Oil Co. 1 Frank Antilley, T. Williams Sur. 1, dry, TD

5,709 ft., King 3,390 ft., Reef 3,970 ft., Odom 5,370 ft., Caddo 5,448 ft.

Wichita County: W. F. Palmer 1-G Waggoner, 33-7-H&TC, dry, TD 2,000 ft. Frank Wood 1 Waggoner "LL", A. Gibson Sur., dry, TD 2,000 ft.

Wilbarger County: J. J. Lynn 1 F. A. Streit, 29-9-H&TC, dry, TD 5,927 ft.

Young County: Reno Oil Co. 1 L. F. Gregg, A. Rohus Sur., dry, TD 5,374 ft.

Warren Oil Corp. 1 Boyd Street, TE&L Sur. 3,410, dry, TD 3,197 ft.

Warren Oil 1 L. L. Tate, TE&L Sur. 108, dry, TD 4,859 ft., Mississippian 4,760 ft.

Texas Gulf Coast

DeWitt County Gets Wilcox Gas-Condensate Discovery

HOUSTON. — Wilcox gas-condensate production has been opened in extreme southwestern DeWitt County approximately 5 miles south of Yorktown at Rowan & Hope 1 Mary Henze, Jose Santos Survey, Abstract 420. On drill-stem test at 7,344-60 ft., using 1,500-ft. water cushion and ¼-in. chokes, the well developed 80 psi. working pressure and flowed water and condensate. Another sand was cored, and drill-stem test of section 7,360-80 ft. recovered 30 ft. of condensate through ¼-in. chokes. Bottom-hole pressure was 3,125 psi. flowing and 3,300 psi. shut in.

Arcola field in Brazoria County has been extended a half mile south at Floyd L. Karsten 1 V. Vilven, J. S. Talmage Survey, Abstract 561. The well flowed 122 bbl. of 41°-gravity oil daily through perforations at 7,612-14 ft. Hole is bottomed at 8,255 ft. with 5½-in. casing cemented at 7,689 ft.

McCarthy Oil & Gas Corp. D-3 W. S. Davidson Estate, west extension to Big Hill field, Jefferson County, flowed at the rate of 160 bbl. of 39.7°-gravity oil per day through 7/64-in. choke. Production was through perforations at 8,428-32 ft. and 8,439-41 ft. Hole is bottomed at 8,479 ft. with production string cemented at that depth.

Deep Rock Oil Corp. 1 Standard Trust, wildcat 3 miles northwest of Flatonia in Fayette County, is preparing to run tests after operator set casing on bottom at 2,271 ft. The well indicated oil production when drill-stem test was run at 2,235-50 ft. Tool was open 20 minutes, and recovery was 1,575 ft. of pipe-line oil. Another section at 2,188-98 ft. was drill-stem tested and recovery was 630 ft. of pipe-line oil. Operator will test other horizons which indicated production. This prospective discovery is located in the James Parrott ⅛ League, Abstract 258.

Sunray Oil Corp. 1 Otto W. Zamzow, prospective oil discovery in Live Oak County, has set 5½-in. casing at 7,251½ ft., and operator is preparing to perforate for completion. The well recovered oil on several drill-stem tests conducted at 7,247-52 ft.; 7,237-42 ft.; and 7,242-47 ft. The pay was topped at 7,166 ft., showing gas at 7,166-235 ft.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Brazoria County: Production Service Oil Corp. 1 Elbert C. Martin, HT&B RR Sec. 53, A-286, dry, TD 8,612 ft.

Fort Bend County: Harold Link 2 J. F. D. Moore, et al, Jesse Vance Sur., A-91, dry, TD 6,514 ft.

Goliad County: Dallas Husky, et al, 1 J. Fell, Sampson McTornail Sur., A-195, dry, TD 3,150 ft.

Dallas Husky, et al, 1 R. F. Wilkerson, J. Calaghan Cur., 2¾ mi. NW of Berclair, dry, TD 3,155 ft.

Karnes County: Ryan, Hays & Burke 1 Stanik & Jerome Lyssy, Fleming T. Wells Sur., A-289, dry, TD 6,866 ft.

Liberty County: British-American Oil Producing Co. 1 B. H. Willis Estate, H&TB

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RR Sec. 6, 10 mi. SW of Nome, dry, TD 8,414 ft.

Humble Oil & Refining Co. 1 E. B. Pickett, Jr., et al, Hickett & Ager Sec. 20, A-789, dry, TD 7,261 ft.

Mississippi

Perry County Well Shows Heavy Oil in Tuscaloosa

JACKSON.—Union Producing Co. continues to core shows of heavy black oil from the Upper Tuscaloosa in A-1 B. M. Stevens, 19-4n-9w, Perry County. Approximately 9½ ft. net sand was recovered in cores from 7,379-94 ft., and on 30-minute drill-stem test at 7,281-94 ft., recovery was 100 ft. of 10°-gravity oil. At last report, operators had drilled and cored ahead to 7,432 ft. with only thin sand stringers being encountered.

Continental Oil Co. is testing the Smackover formation from open hole below casing at 1 John R. Cameron, 36-10n-1e, Madison County wildcat. This well is bottomed at 14,258 ft., but pipe was stuck while reaming core hole at 14,179 ft. Pipe was fished out down to 13,970 ft. and operator set 5½-in. casing at 13,783 ft. Top of Smackover sand was encountered at 13,717 ft. and first lime at 13,825 ft. Tubing was set on packer at 13,730 ft., and the well was swabbed approximately 4 hours before it kicked off and started cleaning. Only sour gas was produced. While cleaning into pits through 12/64-in. choke, tubing pressure was reported at 1,120 psi. and built up to 1,300 psi. when shut in.

The second producer for Church Hill field, Jefferson County, has been completed at Kirby Petroleum Co. 1 Sam Woods, 41-9n-2w. On final test, the well flowed 148 bbl. of oil at 5,516-20 ft. from the Artman sand of the Wilcox. Gage was made through ⅛-in. choke with tubing pressure of 520 psi. and casing pressure of 660 psi. This is a west offset to the discovery.

MISSISSIPPI WILDCAT FAILURES

Adams County: Petersen Drilling Co. 1 Francis & Lucie Beddis, 25-5n-1w, dry, TD 7,014 ft.

Jefferson County: D. C. Latimer-Sunnyland Contracting Co. 1 J. M. Johnson, 39-9n-2e, dry, TD 6,515 ft.

Wayne County: S. B. Daws-R. Stanley-L. Cashion Co. 1 Willie White, 25-10n-8w, dry, TD 5,140 ft.

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California

Bulk of Drilling Continues Around State's Old Fields

LOS ANGELES.—Development in California's older fields, and in newer pools associated with these fields, continues to account for the great bulk of drilling activity. Principal exceptions are 2-year old South Cuyama, where Richfield Oil Corp. again has about eight rigs at work, and the 3-year old San Ardo field of Monterey County where about the same number of rigs are at work.

Also in the Placerita area of Los Angeles County, following the purchase of some 400 acres of undeveloped leases there last month, Tevis Morrow has seven rigs busy on a program which may result in about 100 new wells being drilled. These properties were more or less proved for production in the past 3 years.

With Long Beach Oil Development Co. preparing to start a 100-odd well drilling program at Pier A in the Terminal Island area of Wilmington, this old field will no doubt continue to provide more than 10 per cent of the state's total new wells.

Although adding nothing to the state's current production, the Navy's stepped-up drilling program at Elk Hills is providing work for an additional half-dozen rigs.

At California's third "giant" field, Ventura Avenue, development of proved locations is keeping over 20 rigs busy. Some 13 of these are drilling for Shell Oil Co.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, Pleito Creek area, new field discovery: Humble Oil & Ref. Co. B-1 Kern County Land 34-35, 35-11n-21w, pumped 65 bbl. of 16.6°-gravity crude daily, cut 0.1 per cent, from sand at 4,275-4,335 ft., TD 5,451 ft., redrilled TD 4,387 ft., elev. 1,906 ft.

CALIFORNIA UNSUCCESSFUL WILDCATS

Los Angeles County, Little Tejunga Canyon area: E. L. Doheny 1 E.L.D.-DeMille 5-2n-14w, dry, TD 2,611 ft., elev. 1,280 ft.

Marin County, Point Reyes area: Standard Oil Co. of Calif. 1 Mendoza, 22-2n-10w, dry, TD 951 ft., elev. 259 ft.

San Benito County, Bear Valley area: D. D. Feldman Oil & Gas 1 Woodward & Reynolds-USL, 14-16s-7e, dry, TD 3,239 ft., elev. 1,700 ft.

San Luis Obispo County, Cuyama Valley area: Richfield Oil Corp. A-1 Mettler, 13-10n-25w, dry, TD 12,312 ft., elev. 2,480 ft.

Morales Canyon area: Richfield Oil Corp. 72-4 M. L. Howard, 4-11n-28w, dry, TD 2,993 ft., elev. 2,800 ft.

Santa Barbara County, Cuyama Valley area: E. H. Christian Drilling Co. 2 Christian, 33-11n-28w, dry, Cretaceous 970 ft., TD 1,021 ft., elev. 2,210 ft.

Cuyama Valley area: Richfield Oil Corp. 1 Dahl, 27-10n-27w, dry, TD 6,180 ft., elev. 2,644 ft.

Los Alamos area: Honolulu Oil Corp. 1 Price, 21-8n-32w, dry, TD 6,303 ft., elev. 960 ft.

Solano County, Rio Vista area: The Texas Co. 2 Ryer Prospect Comm., 32-5n-3e, dry, TD 4,989 ft., elev. 7 ft.

Tulare County, Lindsay area: Lindsay Community Development Association 1 "Well," 15-20s-26e, dry, TD 1,150 ft.

Oklahoma

Deeper Pay Zone Proved In Old West Moore Well

MID-CONTINENT PETROLEUM CORP. has opened a new, deeper pay zone for the West Moore pool in Cleveland County with the completion of its 3 Harris, C NW SW 29-10n-3w, flowing 73 bbl. of distillate with 2,745,000 cu. ft. of gas on a 24-hour gage through ¼-in. choke from the Joins sand, opposite which casing is perforated at 9,452-69 ft.

Originally completed at a total depth of 8,828 ft. in the pool's Wilcox sand pay, the well was deepened through the lower Simpson series to a new total depth of 9,703 ft. in the Arbuckle. The Joins sand is the deepest of four potentially productive new zones found below the Wilcox. Others are the Tulip Creek, topped at 9,058 ft.; the McLish, at 9,178 ft., and the Oil Creek, at 9,290 ft. Drill-stem tests in each zone showed considerable gas and distillate.

In a final completion gage, Carter Oil Co. 1 Garrett, SE SE SE 32-11n-25w, deep discovery well in northwestern Beckham County, flowed 134 bbl. of 40.2°-gravity oil in 21 hours through 3/16-in. choke. Gas flow was at the rate of 160,000 cu. ft. per day. Production is from a Pennsylvanian sand zone with casing (bottom at 10,297 ft.) perforated at 10,280-95 ft. and hole open below the casing to 10,304 ft. (plugged-back depth). Hole had been drilled to a total depth of 11,100 ft.

Sinclair Oil & Gas Co. is continuing tests at its 1 Community-Morrow, C SE SE 6-23n-19w, prospective discovery well 7 miles northeast of Woodward, in Woodward County, in northwestern Oklahoma. Tests so far have been in the Simpson section. On a late reported gage, the well swabbed 15 bbl. of 44°-gravity oil with 52 bbl. of salt water in 14 hours from an interval (casing perforations) at 9,698-9,704 ft. Top of the Simpson was logged at 9,696 ft. Total depth is 10,328 ft. with 7-in. casing at 10,031 ft. Continuing tests have shown steady improvement in relative oil production.

In the meantime, another northwestern Oklahoma rank wildcat located about 25 miles to the northeast of the Sinclair well in western Woods County, has encountered promising oil showings in the top of Mississippian. It is Deep Rock Oil Corp. 1 Phillips, NW NE SE 4-26n-17w. A drill-stem test at 5,807-30 ft. (top of the Mississippian) yielded 170 ft. of oil and gas-cut mud. The oil was heavy and black.

Opening of another pool is in prospect in southwestern Pawnee County where Ashland Oil & Refining Co. got 1,000 ft. of oil in a drill-stem test in Red Fork sand at its 1 Eye Bear, NW NW NW 35-21n-5e. The test took in an interval at 3,217-26 ft. Tester was open 2 hours. Bottom-hole pressure was 1,200 ft. The well had the Oswego lime at 2,800 ft., the Prue zone at 3,000 ft. and the Prue sand at 3,041 ft. A test of the latter sand got gas within 15 minutes but yielded mud and salt water on the breakdown. The location is about 5 miles southeast of Pawnee and about 3½ miles northwest of the Maramec pool, nearest production.

Peppers Refining Co. and Carter Oil Co. have found promising oil and gas showings in the Granite Wash zone at their 1 Fritts, NW SW SW 31-3n-8w, southern Grady County wildcat. The well is 2 miles northwest of the Beaver pool, northwestern Stephens County. Granite Wash was logged at 5,198 ft. First drill-stem test, lasting 80 minutes and taking in an interval at 5,200-32 ft., flowed gas at an estimated rate of 1,500,000 cu. ft. per day after 20 minutes and filled 200 ft. with muddy oil (40.6° gravity). Second test, lasting 60 minutes and taking in an interval at 5,222-62 ft., had gas (no estimate of volume) in 55 minutes, and recovered 570 ft. of gas-cut mud. Flowing pressure was 575 psi. Hole is being deepened.

OKLAHOMA SUCCESSFUL WILDCATS

Hughes County: Dietrick, Elliott & Jackson 1 Bagwell, NE NE SW 27-8n-10e, flowed 5,030,000 cu. ft. gas from Cromwell at 3,357-81 ft., TD 3,435 ft., Booch 2,398 ft., Harts coal 2,540 ft., Harts sand 2,556 ft., Gilcrease 2,750 ft., Union Valley 2,854 ft.

Osage County: Service Drilling 1 Osage, SE NE SE 5-24n-7e, flowed 96 bbl. oil from Burbank at 2,662-2,711 ft., TD.

Oliphant 3 Osage, SW SE SE 2-25n-3e, pumped 35 bbl. oil from Perry sand at 2,359-67 ft., TD 3,630 ft.

Stephens County: Skelly Oil 1 O. C. U., NE NE NE 14-2s-4w, pumped 76 bbl. oil from Woodmansee sand at 4,151-4,218 ft., TD 5,054 ft., Hoxbar 1,450 ft., County Line lime 2,010 ft., Deese 2,762 ft., Culbertson 2,787 ft., upper fusilinid 3,085 ft., lower fusilinid 3,440 ft., Tussy 3,790 ft., Tussy lime 3,872 ft., Woodford 4,240 ft., Hunton 4,481 ft., Chimney Hills 4,892 ft., Sylvan 4,956 ft.

OKLAHOMA WILDCAT FAILURES

Beckham County: Carter et al., 1 Abercrombie C-307, NW SE SE 36-9n-22w, dry, TD 3,100 ft.

Carter County: W. F. Turner 1 Howard, SE SW NW 7-5s-1e, dry, TD 4,611 ft.

Sun Oil 1 Brady, NW NW SW 22-1s3w, dry, TD 6,501 ft., base County Line lime 2,448 ft., Deese 2,910 ft., Tussy 3,003 ft., Tussy lime, 3072 ft., Springer 4,055 ft., Markham 4,542 ft., Aldridge 4,652 ft., Humphrey 5,004 ft., Sims 5,553 ft., sand 5,798 ft., Goodwin 6,194 ft., sand 6,432 ft.

Creek County: Sunray 1 Leverette, SE NE SE 18-16n-10e, dry, TD 2,937 ft.

Hughes County: Walker 2 Smith, SE NW SE 30-5n-9e, dry, TD 1,000 ft.

Kingery & Mason 1 McCrory, SE SE SW 2-7n-9e, dry, TD 3,588 ft.

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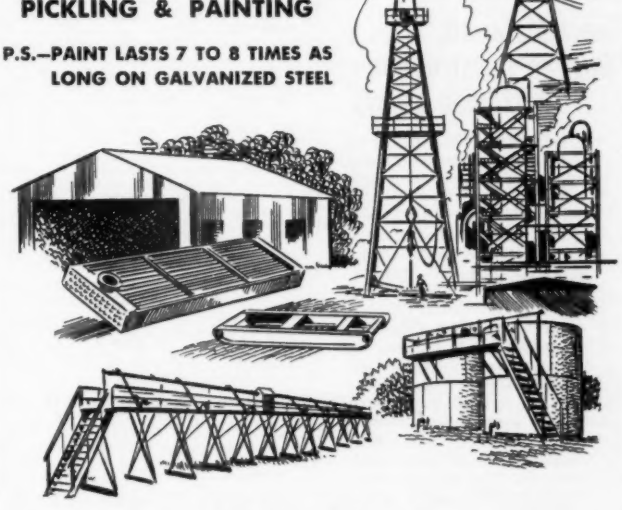

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Logan County: Jordan i Moore, NW SW NW 8-16n-1e, dry, TD 5,581 ft.

Okfuskee County: Portable Drilling 1 Walker, NE NE SW 17-13n-7e, dry, TD 2,846 ft.

Osage County: Jackson 1 Osage, NE NE NE 18-22n-8e, dry, TD 2,553 ft.

Pottawatomie County: Fourdee Rhodes Oil 1 Blair, SW NE NE 9-9n-4e, dry, TD 4,861 ft.

Tillman County: Parker 1 Fuller, SE SE SE 1-5s-15w, dry, TD 3,546 ft.

Southwest Texas

New Oil Sand Found by Portilla Field Wildcat

CORPUS CHRISTI.—Portilla field, San Patricio County, has a new pay sand at Superior Oil Co. 29 Minnie S. Welder, Welder Ranch Subdivision. Oil was tested at a rate of 173 bbl. per day through 8/64-in choke throuhg perforations at 8,642-68 ft. Gravity was 33.9°. Operator first perforated at 9,030-70 ft. and 9,090-108 ft. where the well tested dry gas and perforations were squeezed.

Humble Oil & Refining Co. has set 5½-in. production string at total depth of 8,700 ft. in 1 Fanny D. Wilson, wildcat located 1½ miles southwest of White Point field in San Patricio County. Sidewall samples with oil odor were recovered at 8,444, 8,479, and 8,490 ft. after running electric log to 8,560 ft. The well was drilled to a total depth of 8,700 ft. and previously recovered oil on drill-stem tests conducted at 8,392-99 ft. and 8,378-84 ft. This discovery is in J. F. Smith Sur., A-153.

A Duval County wildcat had a show of oil and operator has set 7-in. casing at 3,205 ft. before testing. Argo Oil Corp. E-1 J. E. Murphy Estate, located in BS&F Survey 112, Abstract 1,592, had show in sidewall samples taken at 2,505-12 ft. and 3,082-86 ft.

In the extreme southeastern portion of McMullen County, Sunray Oil Corp. 1 A. M. Hostetter, wildcat, is bottomed at 10,244 ft. in the basal Wilcox zone and operator will run 5-in. liner to total depth after running microlog. No information has been released on most of the sections cored in this well, but it is known that a number of showings have been logged. Location is in Justo Corona Survey 68, Abstract 1122.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCAT

Starr County: Gas discovery—Bass-Vessels 1 Gregoria Garcia, et al, Sec. 6-B, Santa Cruz Grant, TD 6,005 ft., perf. 4,614-50 ft., IP: 2,900,000 cu. ft. of gas per day on open flow.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Atascosa County: Pantex Oil Co. 4 F. P. Burton, Joseph Reynolds Sur., A178, dry, TD 5,970 ft.

Southern Minerals Corp. 1 Smith & Mowinkle, W. E. Tomand Bros. Sur. 4, A-1186, dry, TD 4,000 ft.

Frio County: S. F. Hurlbut, et al, 1 E. L. Schorp, Joe Schorp Sur. 10, A-1382, dry, TD 6,320 ft.

Jim Wells County: Delhi Oil Corp. 1 R. A. Myrick, Los Presenos de Abajo Grant, 7 mi. NE of Alice, dry, TD 3,606 ft.

Medina County: John F. Camp 1 John F. Camp & Sons fee, J. B. Zerr Sur. 48, 5 mi. E of Devine, dry, TD 2,345 ft.

Wilson County: Skiles Oil Corp. 1 S. E. Hassell, et al, E. Smith Sur., 4 mi. S of Nixon, dry, TD 5,008 ft.

Zapata County: A. M. Lacey & H. E. Walton 1 Teodore Martinez, Block 15, C&M RR Sur. 206, dry, TD 4,512 ft.

Farnsworth & Chambers 1 Luz A. Hein, Brazil Pasture, J. V. Borrego Grant, A-563, dry, TD 6,720 ft.

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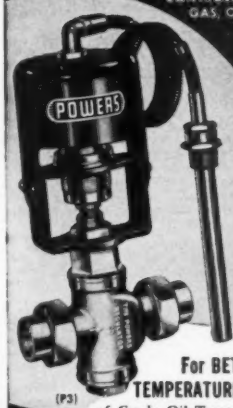

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Permian Basin

Martin County Wildcat Finds Transition-Zone Pay

MIDLAND.—Pan American Production Co. and Forest Oil Corp. 1 F. D. Breedlove, northwest Martin County wildcat, some 13 miles northwest of Tarzan, had proved 64 ft. of pay in the transition zone between the Silurian and the Devonian formations. Cores between 12,074 and 12,138 ft. yielded oil-saturated dolomite and drill-stem tests flowed oil up to 45 bbl. hourly.

First test of the section was from 12,075-98 ft., well flowing an estimated 20 bbl. of oil an hour. It was cored ahead to 12,118 ft., recovering 18 ft. of saturated and porous dolomite.

A drill-stem test to 12,138 ft. was made with 1,800 ft. of water blanket, which came to the surface in 35 minutes; clean oil flowed in 49 minutes. It was cleaned into pits for 36 minutes through 5/8-in. bottom-hole choke, then gaged into storage for 1 hour.

Flowing through the same choke, it gaged 22 bbl. of oil the first 30 minutes and 23 bbl. the next half hour. Shakeout was 0.6 per cent sediment and there was no formation water. Gas-oil ratio was 267 cu. ft. Operators were drilling ahead on a 13,000-ft. contract. Top of the limestone was minus 11,956 ft.

In the Texas Panhandle, The Texas Co. completed its 1-B McGarraugh, in 139-13-T&NO, as the first producer for Ochiltree County. Completion was for 264 bbl. of oil a day through 5/8-in. choke from the Atoka sand of the Pennsylvanian, from 8,473-90 and 8,513-20 ft. Section had been treated with Hydrafrac.

In southeastern Gaines County, Magnolia Petroleum Co. 1 Gertrude Chilton cored good oil shows and porosity in the Pennsylvanian from 11,360-395 ft. and prepared to run a second test. First drill-stem test from 11,344-360 ft. had gas in 45 minutes and recovered 90 ft. of 39°-gravity oil, 1,410 ft. of gas and mud-cut oil, and 90 ft. of slightly oil and gas-cut mud.

Gulf Oil Corp. 2-B Glass, 12-39-In-T&P, southwest Martin County test 5/8 mile northeast of Glass Spraberry discovery, developed a good flow of oil from the Pennsylvanian.

After treating through perforations from 10,450-10,530 ft. and loading with oil, the 2-B Glass kicked off and flowed 387 bbl. of oil and 41 bbl. of sediment and water through 3/4-in. choke in 13 hours and 10 minutes. It then gaged 533 bbl. of oil and 22 bbl. of sediment in 24 hours. At the end of the test the well was averaging 20 bbl. of new oil an hour, having flowed some 500 bbl. of oil load and 420 bbl. of new oil.

A north extension was added to Pembrook field at James H. Snowden 1-19 Graham in 19-N-HE&WT Survey. After treating with Hydrafrac in open hole in the Spraberry from 7,167-97 ft., the well kicked off and flowed 323 bbl. of oil in 11½ hours through ½-in. choke. On completion test it gaged 403.8 bbl. of 37°-gravity oil a day through 3/4-in. choke.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Crockett County: Cities Service Oil Co. 1 Owens "E," 14-GG-EL&RR, Clara Couch area, TD 6,733 ft., elev. 2,771 ft., Canyon lime 6,180 ft., 50 bbl. 63°-gravity distillate and 50,000,000 cu. ft. gas, TP 2,120 psi., GOR 41,450 cu. ft.

Runnels County: Hays & Watts 1 Wm. Fowler, Jr., Sec. 150, ETRR Sur., 2½ mi. N Ballinger, TD 2,352 ft., elev. 1,693 ft., pay 2,349 ft., pumped 35.7 bbl. 46°-gravity oil.

Mid-Continent Petroleum Corp. 2 Earl Burns, J. W. Meeks Sur. 15, 12 mi. NE Winters, TD 4,040 ft., Gardner 4,015 ft., flowed 560 bbl. oil, 14/64-in. shoke.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Coke County: Humble Oil & Refining Co. 1 Lee Lackey, 272-1A-H&TC, dry, TD 6,560 ft., elev. 2,087 ft., Capps 5,290 ft., Ellenburger 6,295 ft.

Gaines County: Husky Oil Co. 1 Oil Development Co., 20-C35-PSL, dry, TD 11,031 ft., elev. 3,424 ft., San Andres 5,173 ft., Spraberry 8,146 ft., Dean 9,274 ft.

Garza County: Cliff Thomas 1 Anderson-Stoker, 878-97-H&TC, dry, TD 2,810 ft.

Runnels County: Edgar Davis Drilling Co. 1 R. Allen, Sec. 45, H&TB Sur., dry, TD 4,857 ft., Palo Pinto 3,560 ft., upper Capps 3,880 ft.

N. B. Hunt 1 Anna Henkhaus, W. R. Jackson Sur., dry, TD 4,114 ft., Capps 3,721 ft., Goens 3,990 ft.

Homer Price 1 E. C. Grindstaff, J. H. Thompson Sur. 146, dry, TD 3,860 ft., elev. 1,767 ft., Palo Pinto 3,296 ft., Gardner 3,818 ft.

Paul C. Teas 1 Rollin Campbell, T. Williamson Sur. 530, dry, TD 3,988 ft., Capps 3,350 ft., Goen 3,777 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Magnolia Petroleum Co. prepared to complete at its 1 J. B. Brown, Roosevelt wildcat in 6-7s-34e. It was swabbed dry from perforations at 8,131-43 ft. in the Permo-Pennsylvanian section and acidized. When oil load and acid residue was swabbed out the well kicked off and flowed 158 bbl. of oil in 11 hours, then gaged 103 bbl. of 47.8°-gravity oil in 15 hours through ¼-in. choke. Flowing tubing pressure ranged from 225-350 psi.

SOUTHEAST NEW MEXICO WILDCAT FAILURES

Lea County: Wilson Oil Co. 3 Charlotte-State, 5-21s-35e, dry, TD 4,402 ft., elev. 3,683 ft., salt 1,865-3,371 ft., Yates 3,548 ft.

Roosevelt County: Spartan Drilling Co. 1-36 State, 36-4s-31e, dry, TD 7,263 ft., elev. 4,512 ft., San Andres 3,070 ft., Glorietta 4,028 ft., Abo 6,120 ft., Wolfcamp 6,770 ft., granite wash 7,082 ft.

Michigan

Montcalm County Wildcat Flowing Oil From Traverse

MOUNT PLEASANT.—Howard D. Atha's 1 Carlson, SE SE SW 26-11n-7w, Douglas Township wildcat, Montcalm County, was flowing natural from the Traverse this week at the rate of 5 bbl. of oil an hour through a 20/64-in. restricted choke.

Wildcat had flowed a total of 285 bbl. of oil from the Traverse during the first 62 hours after pay zone was perforated. About 200 bbl. of this total had been flowed by heads through the casing. After tubing had been run and flow bean set, well flowed a steady 5 bbl. an hour. No water was reported showing.

The wildcat was drilled out dry in the Dundee-Reed City zones, hole was cased

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with 5-in. at 3,041 ft. Bottom-hole cement plug set at 3,027 ft. Top of Traverse was logged at 2,933 ft. A microlog survey showed best Traverse oil pay from 2,969-74 ft., and it was the top of this zone which was perforated for the Traverse test and completion. The pay zone was perforated at 3-in. intervals from 2,968 ft., 6-in. to 2,969 ft., intervals from 2,968 ft. 6 in., to 2,969 ft. 9 in. Well started to show gas immediately after the first of these perforations and started to flow oil after about 2 hours. It flowed 11 bbl. in 15 minutes during the first head flow and 9 bbl. in 8 minutes on the next head flow. Further tests are being run.

MICHIGAN WILDCAT FAILURES

Allegan County, Allegan Township: Cook Drilling Co. 1 Godfrey, NE SW SW 5-2n-13w, Traverse 1,535 ft., dry, TD 1,554 ft.

Casco Township: Stuart R. Godfrey 1 Armstrong, NE SE NE 7-1n-16w, Traverse 1,167 ft., dry, TD 1,179 ft.

Cheshire Township:: Swanson Consolidated Oil Co. 1 Huth, NW NW NW 30-1n-14w, Traverse 1,233 ft., dry, TD 1,253 ft.

Heath Township: Max Spixel 1 Fuchs, NW NW SE 27-3n-14w, Traverse 1,425 ft., dry, TD 1,464 ft.

Arenac County, Standish Township: Frank E. Roush 1 Demo, NW NW NE 25-18n-4e, Dundee 2,701 ft., dry, TD 2,931 ft.

Isabella County, Lincoln Township: McClure Oil Co. 1 Guthrie, SE NE SW 28-13n-4w, Dundee 3,597 ft., dry, TD 3,619 ft.

Kent County, Parish Township: Rex Oil & Gas Co. 1 Heyboer et al, SW SE SW 13-6n-11w, Traverse 2,023 ft., dry, TD 2,077 ft.

Missaukee County, Norwich Township: Sun Oil Co. 51 Horner, S½ SE NE 28-24n-5w, dry in Richfield, TD 4,619 ft.

Tuscola County, Elmwood Township: Ford Oil Co. 1 Werdeman-Shell, NW NE NW 26-14n-10e, Dundee 2,638 ft., dry, TD 2,849 ft.

Van Buren County, Bloomingdale Township: W. B. Darke 1 Camden et al, NE SE NW 22-1s-14w, Traverse 1,268 ft., dry, TD 1,292 ft.

Eastern Texas

Sandusky Area Completion Extends Production South

DALLAS.—The Sandusky area of Grayson County received a south extension at Prentiss & McCord 1 G. C. Brown, E. Hartzog Survey. On completion test the well flowed 218 bbl. of oil a day through 9/64-in. choke, from casing perforations between 7,101-07 ft.

Other activity in the area, which is steadily growing in importance, included S. D. Johnson 1 G. T. Branham, an outpost test in the McLeod Survey, which was drilling below 7,380 ft. Formation tops had not been reported.

Skeeters & Curry 1 W. T. Cock, wildcat southeast of Hallsville in Harrison County, prepared to perforate after running casing to 6,805 ft. A drill-stem test from 6,672-93 ft. in the Pettit developed heavily gas and distillate-cut mud.

EAST TEXAS (DISTRICTS 5 and 6) SUCCESSFUL WILDCAT

Grayson County: Snuggs and Neal 1 Q. Little, W. M. Allen Sur., A-15, 5 mi. SE Sandusky field, TD 3,629 ft., casing to 3,618 ft. in Pennsylvanian sand, flowed 157 bbl. 37°-gravity oil, 10/64-in. choke, TP 100 psi., GOR 300 cu. ft.

EAST TEXAS (DISTRICTS 5 and 6) WILDCAT FAILURES

Falls County: Jesse White 1 C. Sanders, M. Martinez Sur., dry, TD 1,516 ft., Buda 1,172 ft., Edwards 1,472 ft., Georgetown 1,260 ft.

J. N. White 1-B Mitchell, C. Bosquex Sur., dry, TD 960 ft., in Buda lime.

Harrison County: Humble Oil & Refining Co. 1 J. J. Taylor, W. H. Payne Sur., dry, TD 6,890 ft., elev. 215 ft., Massive anhydrite 5,075 ft.

Henderson County: Hyde & Wiggins 1 Marjorie Sharp, W. T. Jenkins Sur., dry, TD 5,537 ft., elev. 530 ft., Woodbine 4,580 ft., Comanche shale 5,450 ft., lime 5,508 ft.

Kaufman County: Signal Oil & Gas Co. 1 R. M. Drummond, M. DeSoto Sur., dry, TD 4,504 ft., sub-Clarksville 2,190 ft., Woodbine 2,590-3,160 ft., Paluxy 4,010 ft.

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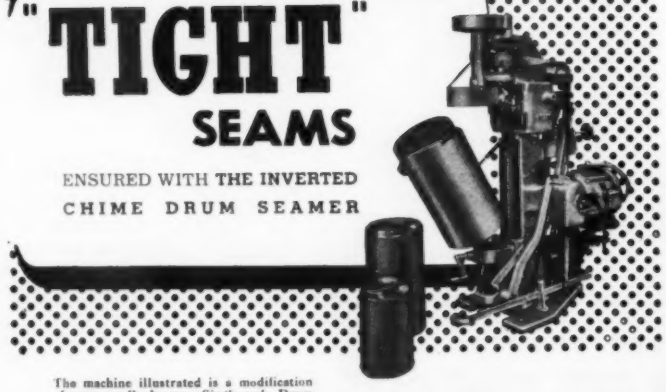

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Amerada Expands North Dakota Play

DENVER.—Amerada Petroleum Corp. has announced locations for two more wildcats in the current North Dakota exploratory program, and continues testing at the 1 Iverson, where oil was produced recently from the Devonian-Silurian formation. The corporation's Binhomer-Risser, C SW SE 12-149n-96w, McKenzie County, is 35 miles south and slightly west of the new well, and the 1 Harry Bakken, C SW NW 12-157n-95w, is 12 miles north of the strike. Both wells will be deep tests to the zones where shows have been logged in the discovery.

At the 1 Iverson, which flowed 307 bbl. of oil in 17 hours through choke from 11,630-60 ft., Amerada recovered water on drill-stem tests below the casing cemented at 11,743 ft. The test was made between 11,736-95 ft., and in 3 hours the recovery was 4,500 ft. of gas and oil-cut mud, 30 per cent oil in the bottom eight stands. Flowing pressure was 3,350 psi. on the test. On another test at 11,734-11,852 ft., with tool open 4½ hours, the recovery was 540 ft. of gas-cut mud, 630 ft. of oil and gas-cut mud, and 3,400 ft. of sulfur water. Flowing pressure was 3,100 psi. The well is now drilling below 11,900 ft.

Continental Oil Co.'s Tensleep discovery in Sussex field flowed 250 bbl. of oil in 4 hours through ¾-in. choke with tubing pressure of 150 psi. in cleaning out this week. The well is 59 Unit, SW NW SE 17-42n-78w, the first well to the Tensleep in Sussex-Meadow Creek pools. The operator is continuing to test on the wildcat. Tensleep was topped at 9,090 ft., and Continental found 137 ft. of effective pay in the formation. Total depth is 9,299 ft., still in the same zone. On another test, with the choke partially plugged, the well made 50 bbl. of oil through 10/64-in. choke in 14 hours. Tubing pressure on this test was 425 psi. Another well of equal importance is Murchison Trust of Dallas 7 Government, NE SE SE 35-42n-78w, in North Meadow Creek field, 3½ miles southeast of the Continental discovery. This well cored saturation below 9,108 ft., some 175 ft. higher structurally than the Continental well. However, on drill-stem test at 9,105-50 ft., the well made 3,967 ft. of water in 1 hour. Because of complex faulting in the area the Murchison well may be in Embar formation, with Tensleep still below. The operator is currently drilling below 9,150 ft.

In northern New Mexico, Continental Oil Co. made location for a 10,500-ft. Pennsylvanian test at 1 South Dulce, SE SE SE 6-28n-2w, Rio Arriba County, an important deep test of the San Juan area.

California Co. will drill 1 Carmin, NE SW NW 15-31n-70w, a Sundance test in the Orin Junction area, Converse County, Wyoming. Atlantic Refining Co. is supdding a shallow test in the North Alkali Butte area of Fremont County, in the SW SE SE 29-1s-6e. Sohio Petroleum Co. has joined the operators in the current Denver-Julesburg basin drilling campaign, with a well at 1 State, NW SE SE 24-8n-51w, in the East Sterling area, Logan County. The same company plans a second wildcat at 1 Lenhart, NE NW SE 7-3n-56w, in the Brush area, Morgan County.

WYOMING WILDCAT FAILURE

North Salt Creek, Johnson County: Continental-Los Nietos et al., 1 McNamara, NE NE SW 2-41n-79w, TD 2,600 ft., dry, Mesaverde 680 ft., Parkman 996 ft., Steele 1,445 ft., Sussex 2,113 ft., Shannon 2,550 ft.

COLORADO WILDCAT FAILURES

Kiowa Elizabeth, Elbert County:: Olds Oil Co. 1 Barnes, C NW NW 27-7s-64w, TD 5,809 ft., dry, Hygiene 5,682 ft.

Holyoke, Phillips County: Wunderlick Contracting Co. 1 LeBlanc, SW SW SE 15-8n-45w, TD 3,955 ft., dry, Niobrara 2,591 ft., Ft. Hays 2,992 ft., Codell 3,041 ft., Fairport 3,090 ft., Greenhorn 3,190 ft., "D" sand 3,425 ft., "J" sand 3,501 ft., Dakota 3,716 ft., Morrison 3,920 ft.

WESTERN NEBRASKA SUCCESSFUL WILDCAT

Johnson, Cheyenne County: Ohio Oil Co. 1 R. W. Johnson, SE SE SW 35-15n-49w, TD 4,650 ft., pumped 222 bbl. oil from third Dakota, Pierre 934 ft., Niobrara 3,660 ft., Ft. Hays 3,937 ft., Codell 4,035 ft., Greenhorn 4,155 ft., first Dakota 4,440 ft., second Dakota 4,497 ft., third Dakota 4,564 ft.

WESTERN NEBRASKA WILDCAT FAILURE

South Harrison, Sioux County: California Co. 1 Mann et al., SW NE NW 27-30n-56w, TD 7,284 ft., dry, Niobrara 3,472 ft., Greenhorn 3,980 ft., Muddy 4,501 ft., Dakota 4,690 ft., Morrison 4,820 ft., Sundance 4,910 ft., red beds 5,110 ft., Minnekahta 5,505 ft., Opeche 5,570 ft., Minnelusa 5,638 ft., Mississippian 7,100 ft., granite 7,250 ft.

Appalachian-Ohio

Deep Test Located In Southwest Pennsylvania

PITTSBURGH.—Announcement has been made of a deep test to be drilled in South Buffalo Township, Armstrong County, southwest Pennsylvania. It is Pittsburgh Plate Glass Co. 2-839 Mary A. McGinley, elevation 1,153 ft., located on the Kittanning Quadrangle several miles west of Ford City. In the north central part of the state, two completions were reported: Wharton Township, Potter County, C. E. Fralich et al., 1 L. M. Brown, 2,992,000 cu. ft. of gas, Onondaga 5,390 ft., Oriskany sand 5,404 ft., gas 5,412-18 ft., total depth 5,425 ft.:

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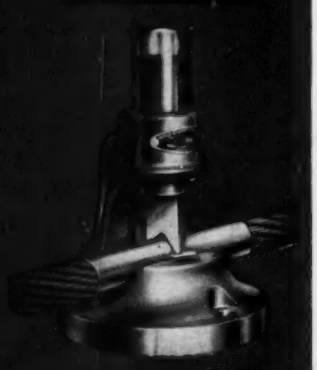

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Leidy Township, Clinton County, Dorsey Calhoun et al., 1 Keystone Hunt Club, dry at 6,125 ft. in Oriskany sand. In Wyoming County, Mehoopany Township, a rank wildcat will be drilled at J. H. Rebolt 1 John Sheehan on the Meschoppen Quadrangle.

Maryland.—In Garrett County, rigs are being moved in at Goodman Brothers 1 John Holschible, and Mid Atlantic Oil & Gas Co. 1 J. C. Laschorn. Shaw & Smith 1 George Harvey (lot), elevation 2,521 ft., topped the chert at 3,855 ft., gas at 3,858 ft. testing 1,500,000 cu. ft., and is drilling at 3,889 ft. Eberly & Snee 1 Floyd Artes reached the Oriskany sand at 3,520 ft. and is drilling at 3,605 ft. New York State Natural Gas Corp. 1-N-230 C. P. Martin set casing at 3,514 ft.; top of the Onondaga was at 3,502 ft.

West Virginia.— a Adkin district, McDowell County, Godfrey L. Cabot, Inc., 39-1325 Pocahontas Land Corp. resulted in 1,801,000 cu. ft. of gas in the Weir sand. Total depth was 4,733 ft.

OHIO

COLUMBUS.—The Ohio Fuel Gas 2 Noble Stuart, Lot 93, Hinckley Township, Medina County, came in with four separate pays totaling 420,000 cu. ft. natural. After shooting with 20 qt., the well was shut in at 930,000 cu. ft. Clinton sand was logged at 3,438-93 ft.

W. C. Adair et al 6 Wm. Bratton, Lot 24, Hopewell Township, Licking County, showed both oil and gas natural, and made 45 bbl. oil in 24 hours plus 1,500,000 cu. ft. of gas in 45 minutes after a 110-qt. shot. Clinton sand was logged at 3,046-86 ft.

Harry Perkins 4 Nancy Priest, Section 11, Jefferson Township, Knox County, found the Newburg at 2,180-97 ft. with 200,000 cu. ft. of gas natural and 435,000 cu. ft. after shot.

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Canadian Fields

Third Success Indicated For New Camrose Area

CALGARY.—Oil success has been indicated at the third Viking sand well in the Camrose area, about 140 miles northeast of Calgary. The discovery team, which last week placed its first followup Viking well on production and is now completing the second, includes Anglo-Canadian Oil Co., Ltd., Home Oil Co., Ltd., and Calgary & Edmonton Corp., Ltd. Site has been staked for the third followup, a ¼ mile east of the completing well.

Data on drill-stem tests run at the current Camrose Viking venture have not been released, but results warranted setting string of production casing. The new indicated producer is Anglo-Home-C. & E.-Camrose 5, in LSD 11, 29-47-20w4, ¼ mile south of the discovery well. It completed drilling at 3,278 ft. and crew was laying down drill pipe at last report, preparatory to setting casing and running production tests.

An encouraging showing of oil from D2 zone of the Devonian was obtained during drill-stem test at an extension venture in the South Leduc area, south of current D2 production. Crew is continuing to core and test at Wagner-Dillabough-North Continental 2, in LSD 14, 9-49-26w4, 1½ miles from Oil City 1, small D2 oil well, 2¼ miles east of Mic Mac D2 production, and slightly over 1 mile northwest of Imperial-Ireton 1, dry hole. The well reportedly found 6 ft. of D2 porosity, from 5,368-74 ft., and ran a 1-hour drill-stem test of that interval. According to company officials the well gave a natural gas flow rate of 300,000 cu. ft. daily, with pipe recovery of 550 ft. of clean oil, 800 ft. of oil-cut mud, and 900 ft. of water. Crew plans to core an additional 15 ft. and run further tests.

Armisie Oil Co., Ltd., Edmonton independent that discovered oil at its initial venture in the Ellerslie area of Central Alberta, has placed its discovery on steady production and will likely announce location for an offset test shortly. The Lower Cretaceous oil strike rated a potential of 100 bbl. daily during a 5-day flow test through a $\frac{7}{16}$-in. choke. The well is now on steady production at its market allowable rate of 50 bbl. daily. Gravity of the oil is 37.5°. The discovery is Armisie 1, in LSD 7, 4-52-25w4, 2¼ miles northwest of Terra Pete 1, Viking oil strike, and around 4¾ miles west-northwest of C.P.R.L.-Ellerslie 1, Cretaceous oil discovery. Armisie's well found a 28-ft. section of clean oil sand from 4,044-72 ft. Perforations were made from 4,045-50 ft., and hole completed drilling at 4,110 ft., with 7-in. casing set at 4,102 ft.

Trans-Empire Oils., Ltd., is rigging up at a wildcat about 6½ miles southeast of Canadian Gulf Oil Co.'s Big Valley Devonian oil production. The new exploratory venture is Trans-Empire-Big Valley 1, in LSD 8, 7-34-19w4, 2¼ miles south-southwest of Tartan 1 wildcat, and 6¾ miles southeast of Gulf-W. C. Brockel 8 exploratory test.

Canadian Superior Oils of California, Ltd., is making hole below 10,145 ft. at its Robertson 9-26, wildcat west of Didsbury, in LSD 9, 26-30-3w5. The venture is now testing the Devonian section. Some natural gas was found in the Cretaceous sands and Madison limestone.

Imperial Oil, Ltd., is starting a deep test on a seismographed feature 4 miles west of the current southern end of Joseph Lake Viking sand oil field, located around 20 miles southeast of Edmonton. The venture will probe all horizons down to and including the Devonian. The well, known as Imperial-Joseph Lake West 1, is located in LSD 15, 7-50-22w4.

CANADIAN SUCCESSFUL WILDCATS

Armisie 1, LSD 7, 4-52-25w4, TD 4,110 ft., 100 bbl. oil, ⅞-in. choke, gravity 37.5°.

Trend-Sylvan Glen 2, LSD 4, 17-64-26w4, TD 3,036 ft., gas well.

Leduc Calmer - Western Properties - Oliver Lake 1, LSD 1, 4-50-21w4, TD 4,360 ft., gas well.

CANADIAN WILDCAT FAILURES

Canadian Delhi-Jeffery 1, LSD 11, 32-58-23w4, TD 2,916 ft.

Sharples et al-Rochester 1, LSD 9, 19-62-24w4, TD 4,178 ft.

Illinois-Ind.-Ky.

White County McClosky Well Has High Natural Flow

A ONE-HALF mile outpost to Iron field in White County, Illinois, is flowing 40 bbl. of oil per hour from the McClosky at 3,135-39 ft. Located 2 miles east of Norris City, Coy Oil, Inc., 1 T. E. Johnson et al., SE NW NE 23-6s-8e, was drilled to a total depth of 3,140 ft. A drill-stem test of the interval 3,035-3,140 ft. got gas in 5 minutes and flowed clean oil in 14 minutes. The well has not been acidized.

In Hamilton County, Illinois, about 5 miles south of McLeansboro and ½ mile east of Rural Hill field, J. A. Wasson 1 O'Neal, SE SE NW 8-6s-6e, swabbed 20 bbl. of oil per hour after a 60-quart shot in the Aux Vases at 3,076-85 ft., total depth.

Also in Hamilton County, about 9 miles south of McLeansboro and ½ mile south of Walpole pool, Howard D. Atha 1 Davis, SE SW SE 33-6s-6e, continues to give indications of making an excellent well. After flowing clean oil in a drill-stem test of the Aux Vases sand at 3,175-90 ft., casing was run to the top of the pay. When the plug was drilled the well came in flowing clean oil at an as yet unreported rate.

George & Wrather Drilling Co. 1 Mina Beach, NW SE NW 10-2n-10e, Richland County, Illinois, about 6 miles south of Olney and 2 miles east of production in Calhoun field, has been completed for a pumping potential of 56 bbl. of oil per day.

In Edwards County, Illinois, Walter Duncan 1 H. E. Wasson, SW NE SE 7-2s-10e, 5 miles southwest of Albion and 2½ miles from production in the Ellery area, has been completed from the Rosiclare at 3,389-93 ft. for 10 bbl. of oil and 70 bbl. of water per day. The pay was treated with 3,000 gal. of acid.

Skiles Oil Corp. 1 Orwic Seiler Community, NE NE SE 24-6s-12w, Posey County, Indiana, swabbed 812 bbl. of oil during the fourth day of testing the Biehl sand at 1,601-12 ft. This well is located 5 miles west of Evansville near the village of St. Phillips and is ⅜ mile south of a Cypress producer completed last November by Skiles. The Cypress was found dry in the Orwic Seiler well and casing was set to test the Biehl sand from which a drill-stem test at 1,596-1,612 ft. recovered gas in 20 minutes and flowed oil in 25 minutes.

G. L. Reasor's two outpost tests in the Wyman area north of Guffie pool in northern McLean County, Kentucky, which have both indicated oil production in preliminary tests, are preparing to run final tests. Reasor 1 Stanley Pinkston, near the center of NE SW 7-N-27, a prospective Jackson sand producer at 1,792-1,806 ft., drilled plug after cementing casing 1 ft. in the top of the pay. The well swabbed oil at the rate of 3 bbl. per hour and was then shot with 20 qt. The other well, Reasor 1 E. M. Pinkston, about 1 mile to the east in the SE SW SW 8-N-27, is waiting on cable tools to test the richly oil-saturated Hardinsburg.

ILLINOIS WILDCAT FAILURES

Crawford County: Van Tarble 1 J. M. Goodwin, SE SW NW 1-7n-12w, dry, TD 1,047 ft.

Fayette County: Bolin and Appleby 1 Kendall, SW SW SE 3-5n-4e, dry, TD 2,499 ft.

Macoupin County:: Clark and Nye 1 Senaldi, NE NE SE 34-7n-6w, dry, TD 1,747 ft.

Marion County: J. M. Miller 1 Corurson, SW SW SE 22-3n-3e, dry, TD 2,581 ft.

C. R. Wynn 1 E. L. Sharp, SW NE NE 17-4n-1e, dry, TD 1,531 ft.

Shelby County: J. F. Jones 1 N. Turney, NE SE SE 34-12n-4e, dry, TD 1,920 ft.

Washington County: E. A. Albering 1 Edward Marquard, SE NW NW 10-2s-5w, dry, TD 2,445 ft.

Wayne County: W. W. Dayton 1 L. Silgert, SW SW NE 35-1n-9e, dry, TD 3,433 ft.

Calvert Drilling Co. 1 T. T. Moore, NW SW NE 23-1s-5e, dry, TD 3,263 ft.

White County: Paco Petroleum Co. 2 E. P. Kirk, NW SE SW 29-4s-8e, dry, TD 3,529 ft.

J. B. Buchman 1 Austin, NW NW SE 30-6s-9e, dry, TD 3,360 ft.

INDIANA WILDCAT FAILURES

Gibson County: C. E. Skiles 1 Kerns, SE SW NE 35-3s-12w, dry, TD 2,670 ft.

Knox County: Walton Drilling Co. 1 C.Pielemier, Don 119-2n-8w, dry, TD 1,404 ft.

H. D. Atha 1 Paul Like, Don 171-2n-9w, dry, TD 1,593 ft.

Hayes Drilling Co. 1 E. C. Watson, NW NE NW 21-1n-11w, dry, TD 2,184 ft.

Posey County: Stanford Oil Co. 1 Horace Greathouse, SW SE NW 2-6s-14w, dry, TD 3,127 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Henderson County: R. E. Hupp et al., 1 Hortung, NE SW SW 5-Q-25, dry, TD 2,340 ft.

C. E. Skiles 1 J. Rash, NE SW SW 19-Q-25, dry, TD 2,372 ft.

David Black 1 E. G. Gish, SE SE NW 23-P-24, dry, TD 2,549 ft.

Basin Drilling Co. 1 Stone, NW NE NW 25-P-26, dry, TD 2,401 ft.

Daviess County: W. J. Briney 1 James Aud, SW SE NW 19-O-32, dry, TD 787 ft.

McLean County: R. E. Hupp et al., 1 H. Ratliff, SE NW SE 1-M-28, dry, TD 2,358 ft.

Flem Douthitt 2 J. H. Ellis, NW NE SE 17-M-28, dry, TD 2,529 ft.

Webster County: Sun Oil Co. 1 Wilson-Majors, NW SE SW 23-N-23, dry, TD 2,682 ft.

Delta Drilling Co. 1 L. Winstead, NW SE SW 5-L-23, dry, TD 3,237 ft.

South Louisiana

New Sand Indicated For Cox Bay Field

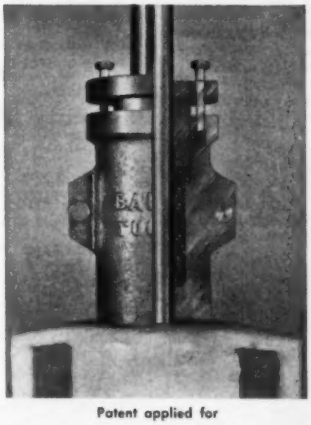
NEW ORLEANS.—A new sand apparently has been opened in Cox Bay field, Plaquemines Parish, at Richardson & Bass 20-H State Lease 1794-Cox Bay Unit 4, 17-18s-16e. The well is producing gas and condensate through perforations at 8,500-03 ft. On initial test, the well flowed 1,400,000 cu. ft. of gas plus 300 bbl. of 55.2°-gravity distillate per day through ⅛-in. choke. Hole is bottomed at 11,335 ft. with 7-in. casing cemented at 11,329 ft. Production in Cox Bay, discovered last year, is normally from the 9,700-ft. horizon.

The third oiler for the new Burtville field, East Baton Rouge Parish, has been completed at Shell Oil Co. 3 V. J. Gianelloni. Through casing perforations at 9,843-71 ft., the well flowed 271 bbl. of 41°-gravity oil daily through 9/64-in. choke. This three-well field is productive from two pay horizons. Discovery was completed at 10,876-90 ft.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

St. Mary Parish: Gas-condensate discovery—Shell Oil Co. 1 State Lease 1593, Twp. 18s-10e, TD 14,697 ft., perf. 9,535-42 ft.,

Polish Rod Lubricator—



Patent applied for

. . . for wells that head up and flow. Lubricator is packed with shredded graphite, and rests on top of any stuffing box.

The lubricator built in two pieces does not require a service unit for installation. It also prevents oil spray if the packing lets go.

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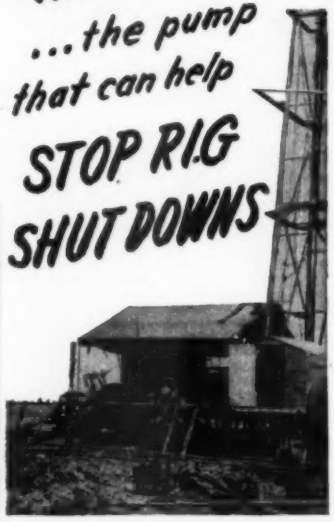
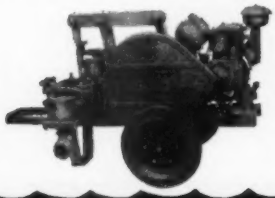


With this famous diaphragm pump on the job you don't need to shut down your rig to clean cuttings from pits, mix muds or pump water. What's more, your slush pump is free to stay on its profit-producing job — circulating drilling mud.

At your rig a Marlow "Mud Hog" can:

Eliminate jets to clean pits
Reduce costly drilling-mud loss to waste pit
Cut down water loss to waste pit
Mix mud and feed slush pump directly . . . eliminate unused mud at slush pump suction
Transfer water from waste pit
Supply water at low pressure

A Marlow "Mud Hog" is the unrivalled "tough baby" of the oil country. Write for complete details about this dependable money-saving pump.



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Engineers and Representatives Everywhere

IP: 34 bbl. condensate per day plus 1,309,000 cu. ft. of gas, 10/64-in. choke, TP 3,250 psi., 51.5° gravity.

SOUTH LOUISIANA WILDCAT FAILURE

Calcasieu Parish: Sohio Petroleum Co. 1 Simeon Derouen, 33-10s-6w, dry, TD 11,002 ft.

Louisiana-Arkansas

Current Interest Centers Around North Shongaloo

SHREVEPORT.—The North Shongaloo area continues to hold the spotlight in North Louisiana-Arkansas activity. Tanks are being completed at the recent extension discovery, Stanolind Oil & Gas Co. 1 Pine Woods Lumber Co. This new well, located in Columbia County, Arkansas, made a two-state area out of the North Shongaloo field. Across the line in Webster Parish, Louisiana, Stanolind is drilling ahead below 4,635 ft. at the C-1 Haynes unit, 1-23n-10w. In Section 2-23n-10w, Hunt Oil Co. is completing a good producer at the 1 Modisette et al. The well flowed 200 bbl. of oil plus 100,000 cu. ft. of gas from perforations in the Pettit at 5,753-78 ft. and 5,800-14 ft. Total depth is 5,874 ft.

Sunray Oil Corp. brought in two good wells. In Dykesville pool, Webster Parish, the corporation's 1 N. D. Morgan, 35-23n-9w, pumped 112 bbl. of 42°-gravity oil from perforations at 5,661-64 ft. in the Pettit. Total depth is 5,695 ft. In Benton field of Bossier Parish, Sunray 19 B. F. unit, 1-20n-13w, flowed 251 bbl. of 39.2°-gravity crude from the Bodcaw at 8,135-44 ft., total depth.

A test of the Hosston sand has been planned at Skelly Oil Co. 1 Dave Rabb in Section 19-20n-6w, Athens field of Claiborne Parish.

Activity in Arkansas slumped somewhat during the past week. McAlester Fuel Co. plans to drill two shallow wildcats: A-1 Marian Rouse, 1-14s-20w, Nevada County, and A-1 J. W. Merritt, 14-14s-10w, Ouachita County. The Rouse venture is scheduled to go to 2,750 ft., and projected depth of the Merritt test is 3,000 ft.

NORTH LOUISIANA WILDCAT FAILURE

La Salle Parish: J. S. Michael et al., 1 Nebo Oil "K." C SW NE 27-7n-2e, dry, TD 4,510 ft.

ARKANSAS SUCCESSFUL WILDCAT

Columbia County: Stanolind 1 Pine Woods Lumber Co., 551 ft. N and 660 ft. E of SWc 11-20s-22w, 267 bbl. oil from Pettit at 5,743-52 ft., TD 5,860 ft.

Union County: Atlantic Refining 2 Bishop, SE NW SW 13-18s-17w, 139 bbl. oil from Pettit at 3,927-32 ft., TD 4,001 ft.

ARKANSAS WILDCAT FAILURES

Cleveland County: Ginsberg et al., 1 Vandermark, NW SW NE 15-9s-11w, dry, TD 3,704 ft.

Union County: Pan-Am Southern 1 U. S. M. "A," SE SW SE 23-19s-13w, dry, TD 3,611 ft.

Falcon Products Names Canadian Representative

L. A. Theisen, vice president, Falcon Products, Inc., Pomona, Calif., manufacturers of slush-pump expendables, has announced the appointment of Delbert Lewis, operating as Import Tool Co., Ltd., Calgary, Alta., as manufacturers' representative.

Warehouses will be located in Calgary and Edmonton.

Automatic Firing Controls for Oil or Gas

Users of steam will be glad to know Inferno Firing Controls operate efficiently for either oil or gas. Regardless of where you move, you can take advantage of the cheaper fuel when your boilers are equipped with Inferno Firing Controls. Write today for complete information. Ask for a FREE copy of Bulletin 8-B. Inferno products are sold through regular supply stores.

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Each switch is tested and calibrated for dependable accurate service.

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Grancell Completes New Plant at Los Angeles

New plant of I. H. Grancell in Los Angeles.

I. H. Grancell, Los Angeles, manufacturers of 'Bestolife lead-seal pipe-joint compounds, has just completed construction of its new plant in Los Angeles, entirely over the old plant.

The plant occupies 9,400 sq. ft. of floor space and is devoted exclusively to the manufacture of 'Bestolife lead-seal pipe-joint compounds, which include the No. 270 and the No. 960, developed specifically for liquid petroleum gases.

Hamilton Reorganizes Former Consultant Firm

Dr. R. G. Hamilton, Tulsa, has reorganized the original firm of Hamilton Well Log Consultants, which now offers world-wide evaluation and consulting services in well logging and electric-log interpretation, as well as instructural conferences in log interpretation for oil companies.

A new service has been added, and the firm will distribute the new Arps-Hamilton Loganalyzer, a pocket-size sliderule condensing all necessary log quantitative relationships into a practical, easily operated calculator for obtaining porosity, water and oil saturations, and permeability from electric logs.

Hamilton was associated with Schlumberger Well Surveying Corp. for 15 years, and recently was with L. G. Chombart under the firm name of Hamilton & Chombart.

Oil Well Moves Eastern Division Sales Office

Oil Well Supply Co.'s tubular and eastern division sales office, both in Pittsburgh, have been moved into U. S. Steel Corp.'s new office building in Pittsburgh. This announcement was made by K. B. Winstead, general manager of sales for this U. S. Steel subsidiary.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that approximately 1600 acres comprising the Sioux Ordnance Depot, Cheyenne County, Nebraska, will be offered for oil and gas leasing in three parcels, through competitive bidding at 1 p.m., Eastern Standard Time, June 27, 1951, when bids will be opened. Operations on the land must be so conducted as not to interfere with the primary use of the land as a Military Reservation. Details of the lease offering, how and where to file bids, and copy of the form of lease may be obtained by addressing an inquiry to the Oil and Gas Supervisor, at Casper, Wyoming, or to this office. Marion Clawson, Director.

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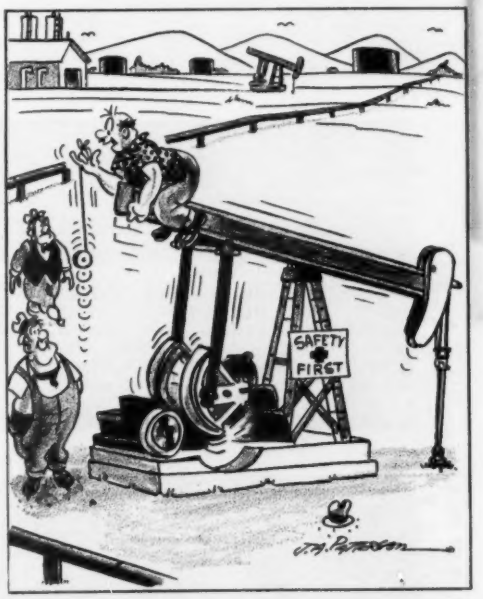
Foreign: D. T. O'Connor, 500 Fifth Avenue, New York, N. Y.; Petroleum Industry Consultants, C. A., Caracas, Venez.; Denton-Spencer Co., Ltd., Calgary, Alberta, Canada.



THE OIL AND GAS JOURNAL

"Look! My yo-yo works without me moving a finger!"

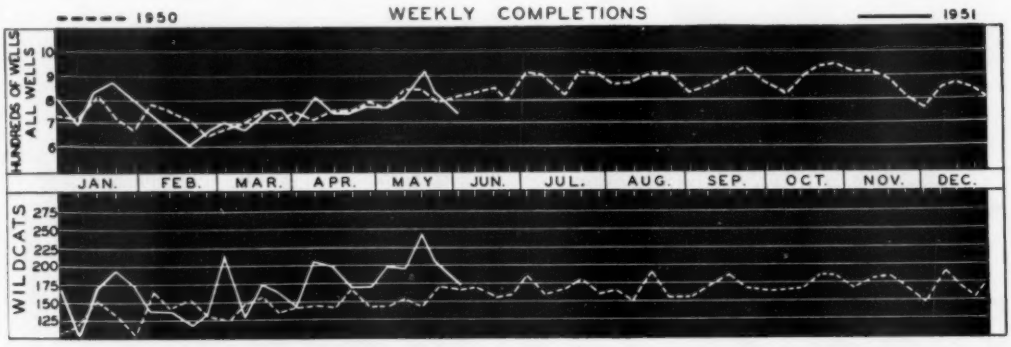
CURRENT STATISTICS

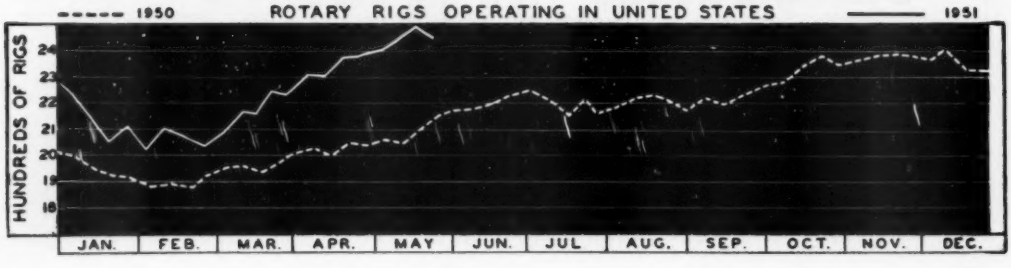
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED JUNE 2, 1951

	Total of all wells					June 2		Wildcat completions and discoveries									
													Cumulative total, 1951				
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	14	7	0	*7	20,440	183	211	0	0	0	0	0	0	0	0	0	0
Pennsylvania	13	6	1	†6	23,201	307	409	0	0	0	0	0	0	0	0	1	1
West Virginia	11	1	8	2	39,102	232	274	0	0	0	0	0	0	0	5	2	7
Ohio	11	3	3	‡5	26,396	343	381	0	0	0	0	0	1	0	3	12	16
Indiana	18	4	0	14	33,537	411	543	0	0	0	5	5	10	0	1	107	118
Kentucky	30	11	0	19	54,173	400	363	0	0	0	9	9	6	0	1	72	79
Illinois	49	17	0	32	129,492	752	961	0	0	0	11	11	17	0	0	149	166
Michigan	17	4	0	§13	38,595	285	345	0	0	0	10	10	11	0	5	116	132
Kansas	63	32	4	27	217,346	1,740	1,482	3	0	1	15	19	86	0	8	334	428
Nebraska	3	1	0	2	16,667	116	36	1	0	0	1	2	4	0	1	52	57
Oklahoma	112	61	5	¶46	384,729	2,341	2,153	3	0	1	12	16	81	1	13	306	401
Texas	272	179	7	86	1,154,982	6,778	6,601	16	1	2	57	76	302	27	51	1,317	1,697
North Central (Dist. 7-B & 9)	100	54	2	‡44	321,962	2,080	2,069	13	0	1	30	44	151	0	8	566	725
West (Dist. 7-C & 8)	80	68	0	12	389,515	2,063	1,914	2	1	0	7	10	63	8	4	259	334
Panhandle (Dist. 10)	11	6	4	1	32,323	293	408	0	0	0	0	0	0	0	0	11	11
Eastern (Dist. 5, 6, & 6-P)	14	6	0	8	54,468	476	450	1	0	0	5	6	4	4	0	94	102
Gulf Coast (Dist. 2 & 3)	31	20	0	11	174,598	944	909	0	0	0	7	7	44	11	31	181	267
Southwest (Dist. 1 & 4)	36	25	1	§10	182,116	922	851	0	0	1	8	9	40	4	8	206	258
Louisiana	32	17	6	9	221,281	814	1,029	0	1	0	2	3	19	1	4	106	130
Northern	16	6	5	5	75,603	405	529	0	0	0	1	1	5	0	3	59	67
Southern	16	11	1	4	145,678	409	500	0	1	0	1	2	14	1	1	47	63
Arkansas	10	7	0	3	30,905	156	159	2	0	0	2	4	7	0	1	31	39
Mississippi	7	3	0	4	46,908	117	138	0	0	0	3	3	6	3	0	43	52
Southeastern States	0	0	0	0	0	32	26	0	0	0	0	0	0	0	0	12	12
Montana	2	1	0	1	3,303	84	70	0	0	0	0	0	0	0	0	21	21
Wyoming	13	9	1	3	60,224	275	222	0	0	0	1	1	4	0	0	42	46
Colorado-Utah	3	1	0	2	13,282	102	33	0	0	0	2	2	3	0	3	50	56
New Mexico	12	8	1	3	56,370	278	271	0	0	0	2	2	7	0	5	34	46
California	50	39	1	10	234,069	875	701	1	0	0	10	11	19	0	1	174	194
Miscellaneous	0	0	0	0	0	19	6	0	0	0	0	0	0	0	10	8	18
Total United States	742	411	37	294	2,805,002	16,640	16,414	26	2	4	142	174	583	32	112	2,989	3,716
Total previous week	824	410	71	343	3,067,245	....	....	41	0	8	152	201	557	30	108	2,847	3,542
Total May 26, 1950	794	432	64	298	2,928,866	....	....	20	1	3	137	161	460	28	78	2,306	2,812

Service wells included: *7, †6, ‡2, §1, ¶3.





DAILY AVERAGE PRODUCTION FOR WEEK

	June 2 crude oil	B. of M. May demand	May 26 crude oil
Alabama	3,000	2,400	2,850
Arkansas	78,150	84,000	78,350
California	964,800	970,000	963,900
Colorado	71,800	78,000	72,300
Eastern	60,000	64,000	62,800
Florida	1,650	1,600	1,575
Illinois	169,100	163,000	166,800
Indiana	28,900	30,000	23,400
Kansas	312,450	303,000	310,850
Kentucky	27,500	30,000	27,100
Louisiana	612,825	632,000	613,125
North Louisiana	116,050		117,100
South Louisiana	496,775		496,025
Michigan	40,300	42,000	40,100
Mississippi	100,150	106,000	97,750
Montana	24,800	24,000	24,400
Nebraska	7,450	10,000	7,300
New Mexico	143,075	140,000	142,800
Oklahoma	504,150	505,000	502,050
Texas	2,751,825	2,500,000	2,750,875
Dist. 1 (Southwest)	33,575		33,823
Dist. 4 (Southwest)	257,875		257,800
Dist. 2 (Gulf Coast)	163,600		165,150
Dist. 3 (Gulf Coast)	482,075		482,875
Dist. 5 (Eastern)	52,725		52,450
Dist. 6 (Eastern)	113,625		113,500
East Texas field	275,200		272,700
Dist. 7-C (West)	97,375		96,800
Dist. 8 (West)	946,300		948,350
Dist. 7-B (W. Central)	86,225		85,875
Dist. 9 (N. Central)	154,650		153,150
Dist. 10 (Panhandle)	88,600		88,600
Utah	3,700	5,000	3,800
Wyoming	197,700	180,000	195,200
Total United States	*6,103,725	5,870,000	6,092,325
Change from previous week, up 11,400			
Canada	145,540		155,895

Total U. S. production January 1-June 2 ..... †914,454,520 bbl.
Same period last year (crude plus cond.) ..... 729,097,380 bbl.

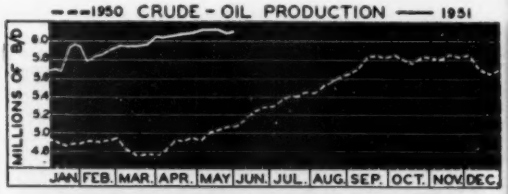
*Not including 104,370 bbl. condensate. †Including 16,434,005 bbl. condensate.

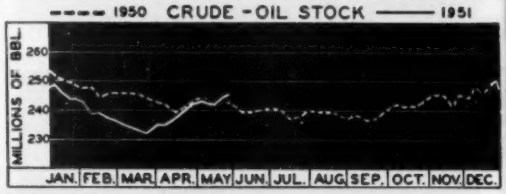
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

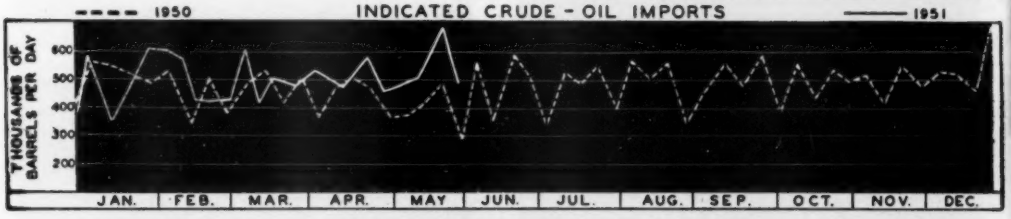
(Thousands of barrels)

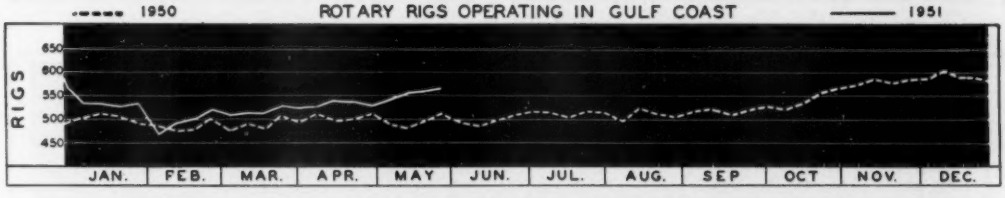
	May 26, 1951	May 19, 1951	May 27, 1950
Pennsylvania Grade	2,061	2,102	2,908
Other Appalachian	1,525	1,578	1,670
Illinois, Indiana, Michigan	11,059	10,667	8,970
Arkansas	2,408	2,424	2,875
Louisiana	14,673	14,067	14,945
North	3,130	2,766	3,817
Gulf	11,543	11,301	11,128
Mississippi	3,198	2,978	2,077
New Mexico	6,684	6,691	5,983
Oklahoma and Kansas	38,493	38,158	36,004
Texas	113,882	112,811	110,294
East Texas	14,274	14,149	15,077
West Texas	46,467	45,947	40,284
Texas Gulf	25,397	24,933	27,444
Other Texas	27,744	27,742	27,489
Rocky Mountain	14,319	14,458	13,160
California	30,361	30,410	36,061
Foreign	7,639	8,029	5,295
Total	246,400	244,383	240,842

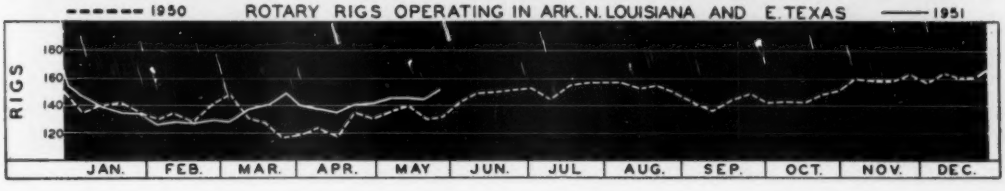
*Bureau of Mines.









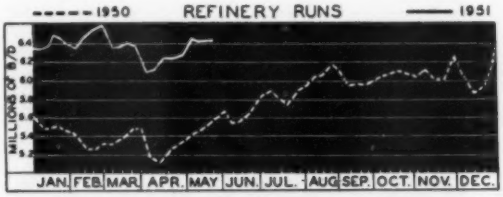

1950 ROTARY RIGS OPERATING IN ARK. N. LOUISIANA AND E. TEXAS 1951
RIGS
180
160
140
120
JAN. FEB. MAR. APR. MAY JUN. JUL AUG. SEP. OCT. NOV. DEC.

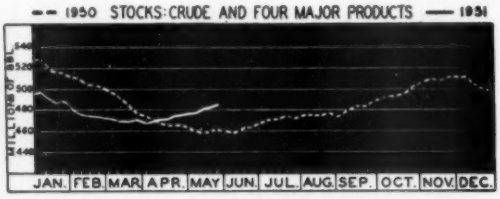
A.P.I. REFINERY REPORT, MAY 26

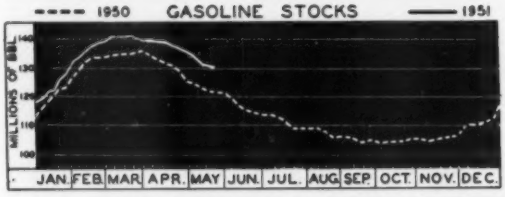
(Thousands of barrels daily)

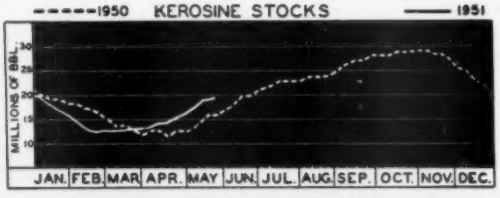
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, May 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	1,061	367.3	45.2	226.3	228.9	27,862	7,872	15,488	9,163	928	377.5	36.2	187.7	206.2
Appalachian:														
District 1	101	47.9	5.1	15.0	11.1	3,091	371	533	355	97	41.0	6.1	12.3	11.2
District 2	79	32.7	5.7	7.1	16.6	1,387	175	254	196	73	33.9	4.6	8.1	13.9
Ind., Ill., Ky.	1,182	626.6	64.4	177.7	166.1	29,052	3,532	9,920	3,515	1,001	526.8	65.5	158.6	141.4
Okla., Kans., Mo.	495	261.6	19.7	111.6	60.1	14,827	974	5,929	1,114	495	268.0	21.5	96.3	57.7
Inland Texas	247	157.4	14.6	43.3	46.1	3,660	359	752	777	212	143.0	11.4	27.5	43.3
Texas Gulf Coast	1,573	721.6	133.7	341.3	258.3	19,488	3,326	6,078	4,506	1,155	551.8	92.6	240.8	201.4
La. Gulf Coast	451	229.8	43.0	122.8	66.0	6,941	1,894	2,849	1,412	473	231.2	55.1	93.0	57.1
N. La. and Ark.	83	33.0	8.3	18.8	8.1	2,511	438	801	73	72	25.3	7.0	13.8	12.0
Rocky Mountain:														
New Mexico	15	8.0	.....	2.9	2.9	104	.....	63	29	13	7.2	.2	2.4	3.4
Other Rocky Mtn.	233	108.0	5.6	37.3	47.3	5,397	250	1,241	691	163	76.3	4.0	31.9	30.2
California	920	420.7	16.7	121.6	380.6	16,490	641	7,436	15,444	853	363.4	11.6	125.0	285.2
May 26, 1951	6,430	3,014.6	362.0	1,225.7	1,292.1	130,819	19,832	51,344	37,365	5,535	2,647.4	315.8	997.4	1,063.0
May 19, 1951	6,405	2,978.1	378.6	1,193.3	1,306.9	132,742	18,725	48,826	37,223	.....	.....	.....	.....	.....
May 27, 1950	5,591	2,672.0	332.4	1,028.7	1,060.1	122,757	16,075	40,607	39,308	.....	.....	.....	.....	.....

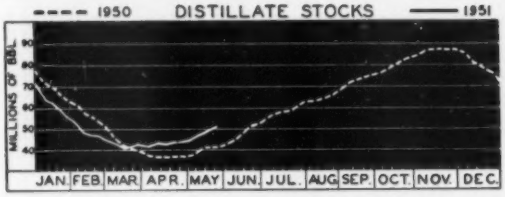
*At refineries including natural blended. †Finished and unfinished.

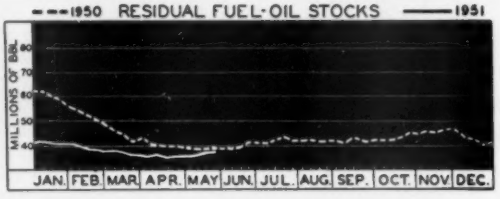


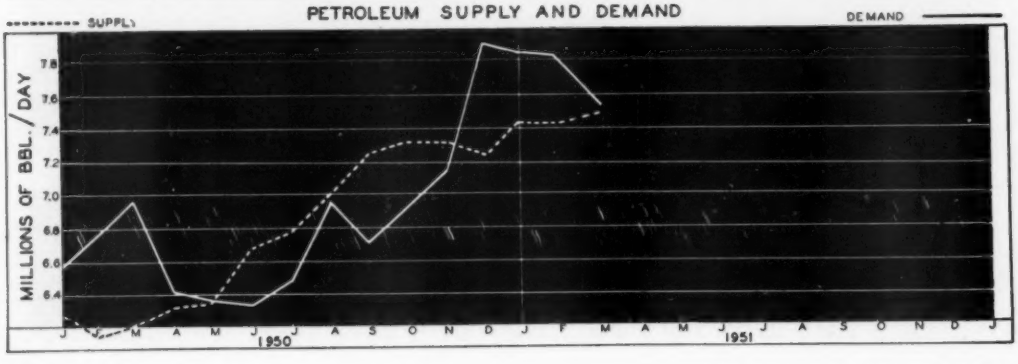












CRUDE PRICES
GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.92	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

LOWER tank-wagon prices for gasoline became general in most northeastern states last week when Esso Standard Oil Co. announced that it would meet competition in gasoline prices to dealers in New England, New York, New Jersey, Pennsylvania, Delaware, and the District of Columbia. In general, Esso was meeting cuts of 1 cent per gallon on regular and 0.5 cent on premium for most of the area and 2-cent reductions at certain points where Atlantic Refining Co. had announced the larger reductions. Many other large suppliers had made reductions earlier.

Suppliers of heavy fuel were swamped with orders for immediate delivery of residual fuel before the higher price ceilings went into effect at points along the East Coast.

Office of Price Stabilization regulation, Amendment 2 to CPR 17, raised ceiling prices for heavy fuel by 17 cents a barrel at points in southern Florida with graduated increases for cities to the north topped by an increase of 31 cents in Maine. These higher ceilings, effective June 4, reflect tanker charter rates established by the Maritime Commission for military shipments from the Gulf Coast to East Coast ports. However, spot charter rates last winter were much higher than the rates for military, and if they move back to the high level again next winter, the new ceilings will not be high enough to preserve a balance between Gulf Coast spot prices and ceiling prices on the East Coast.

The amendment set specific price ceilings for points along the coast, ranging from $2.16 at Tampa, Fla., to $2.51 at Portland, Me., for barge delivery. These covered No. 6 fuel meeting commercial standards. The seller is permitted to add "customary differentials" for low-sulfur fuel or for other lighter grades. Ceilings for barge delivery of commercial grade in New York Harbor is $2.45.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of June 4, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10¼-10½	12-12.75	10⅜-11
Premium gasoline, 86-88 octane	11¼-11½	13.5-13.75	11⅜-12
42-44 w.w. kerosine	9-9⅜	10	8½-9
No. 2 straw fuel oil	8-8⅜	9	7½-8
No 6 residual	$1.75-1.80	$2.25-2.45	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6.1	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

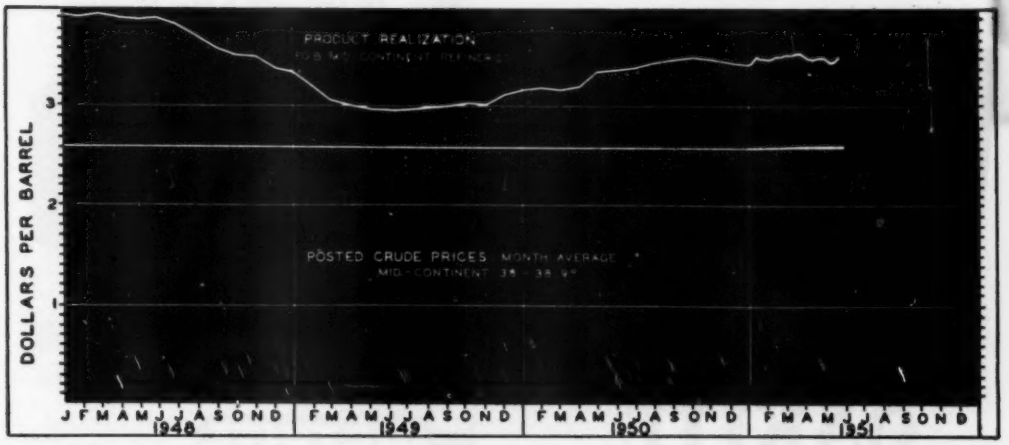
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

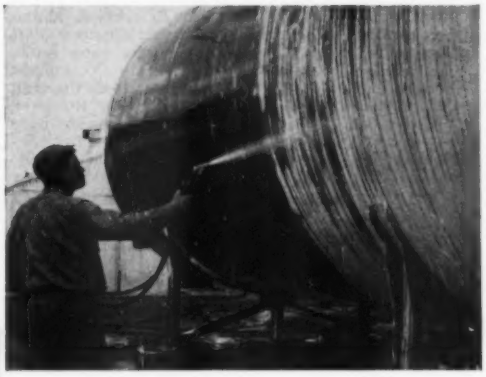
Mid-Continent

132-134 A.M.P.	6.0


PRODUCT REALIZATION
POSTED CRUDE PRICES MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
3
2
1
J F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951

In this trend chart refinery realisation is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realisation averaged $3.50 for week ended May 26, $3.47 for previous week, and $3.37 for May 1950.

How to strip a storage tank



without scraping or sandblasting

BUT FAST—that's how old coats of paint roll off when you strip tanks the quick, money-saving Oakite way.

Powerful Oakite strippers, applied by hot-flow-on, steam-gun, or cold-flow-on method, actually float off paint, dirt, and grease—right down to the base metal. You save time . . . no hand scraping, chipping or blasting. You save money . . . long-life solution may be reclaimed and reused. And you're safe . . . no fire hazard.

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- cleaning tank car interiors
- descaling heat exchangers in place
- reconditioning barrels
- salvaging rigs, valves, fittings

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PETROLEUM SERVICE DIVISION

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The reasons for the growing popularity of these dependable instruments are not hard to find. Here are a few highlights:

Ranges: Any interval of 2000, 7000, or 16,000 feet—special ranges to order.

Self-balancing Principle: No adjustment or setting is required and the altimeter is always in balance with the atmosphere and ready to read. There is no lag.

Calibration: Scales are individually drawn for each mechanism and require no correction. Graduations are spaced for easy readability and not so fine as to cause confusion.

Durability: The mechanism is simple and free from intricate design features. For complete protection it is shockproofed in the instrument case.

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A-83

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FLEXIBLE HOSE ATTACHMENT
for faster, easier pouring.

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EQUIPMENT MEN . . . in the News

National Makes Changes In Engineering Personnel

JOHN SEAGREN

John Seagren has been appointed chief engineer of National Supply Co.'s engine division, Springfield, Ohio, as announced by F. H. Kilberry, general manager of the division.

Harvey W. Hanners and George F. Noltein have been appointed chief research engineer and consulting engineer, respectively.

G. F. NOLTEIN

H. W. HANNERS

Seagren received a degree in mechanical engineering in 1920 from Chalmers Technical University in Gothenberg, Sweden. He has formerly been affiliated with Fairbanks, Morse & Co., Northern Pump Co., and American Locomotive Co., and was in the engine division of Atlas Imperial Diesel Engine Co. when it was purchased by National in 1950.

Noltein has been with National since 1927. He served as chief engineer and director of research until receiving his recent appointment.

Hanners joined National in 1941 as development and research engineer, and before joining National was affiliated with Fairbanks, Morse & Co., and Allis-Chalmers Manufacturing Co.

Westinghouse Names Lawson To Managerial Post

W. W. Sproul, sales manager, industrial products, for Westinghouse Electric Corp., has reported that Thomas R. Lawson has been appointed assistant sales manager of industrial products, with headquarters in Pittsburgh.

Lawson's duties will include responsibility for coordination of industrial products, and will work with division sales and application data and training departments on negotiation procedures and other matters.

Prior to his appointment, Lawson served as assistant manager of the application - engineering department of Westinghouse Motor & Control Division, Buffalo.

Diamond Drilling Opens New Branch in Ventura

Art Moore and Ralph Ruse of Diamond Drilling Co. have announced the opening of a new branch in Ventura, Calif. The new office will be under the direct management of Jack Flanakin who has been operating with Diamond Drilling in the Los Angeles Basin area since its inception.

A complete line of coring tools will be stocked, including Soil conventional and wireline telescoping core barrels, diamond-coring bits, and diamond bits for making holes.

W. L. Walker Co. Installs Fire-Extinguisher Tester

As an additional safety service to the oil industry, a Hydrostatic testing machine has recently been installed by W. L. Walker Co.

The Hydrostatic unit is used for testing of the cylinder of carbon-dioxide fire extinguishers to determine whether or not they will withstand the required test pressures approved by the Interstate Commerce Commission.

The carbon dioxide type extinguishers used in the oil industry have from 800 psi. at 70° F. up to 2,400 psi. at approximate temperatures of 135° F. This maximum pressure can rupture a safety disk or burst a weakened or rusted cylinder.

Hydraulic testing machine recently installed by W. L. Walker Co.

Geophysical Firm Sold To Johnson, Donnally

Earle W. Johnson and Chester A. Donnally have recently purchased Carr Geophysical Co. and will operate under the name of Donnally Geophysical Co. Headquarters will be in Dallas.

Johnson, who is also president of General Geophysical Co., was elected president and Donnally, formerly with Western Geophysical Co., was elected vice president. No other changes are planned.

Whitney Chain Elects Two Vice Presidents

J. W. ANDERSON

C. R. POWERS

Winthrop H. Whitney, president of Whitney Chain Co., recently announced the election of James W. Anderson as vice president of sales, and C. Robert Powers as vice president of manufacturing.

Anderson joined Whitney Chain in 1938, and following assignments at the Chicago and Dallas branches, he was appointed general sales manager of the company in 1948.

Powers was formerly consultant to the president on all phases of Whitney manufacturing activities. Prior to joining Whitney he was associated with Dearborn Motor Corp., Detroit, as divisional head in charge of production and engineering research and development.

Liquid Carbonic Names Graham to Advertising Post

W. A. Brown, Jr., vice president and general manager of Liquid Carbonic Corp., Chicago, has announced the appointment of John A. Graham, Jr., as coordinator of advertising, replacing Bernard J. Oos, recently resigned.

With various sales managers working directly with Liquid Carbonic's advertising agency, Graham will act as liaison man between the various sales operations and the agency.

(Additional Equipment News will be found on pages 150, 151, 162 and 163.)

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Your MARKET PLACE FOR THE OIL AND GAS INDUSTRY...

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$12.00 a column inch one issue . . .
10% Discount three or more issues.

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FOR SALE: One drilling rig complete including 127′ Lee C. Moore mast and 7,200′ of 4½″ drill pipe. Rig capacity 7,500 ft. Now operating in Oklahoma. All equipment A-1 mechanical condition. For further details and inspection write Box E-132, The Oil and Gas Journal, Tulsa, Oklahoma.

IMMEDIATE delivery complete workover Jack Knife Rig. Details and price on application. P. O. Box 3246, Corpus Christi, Tex.

FOR SALE: 4000 ft. 2⅜″ Range 1 drill stem with Hughes Acme tool joints. Charles Clemens, Princeton, Indiana.

FOR SALE: 2000 ft. new American Iron range 1 2⅞″ internal flush pipe with over size tool joints. Charles Clemens, Princeton, Indiana.

FOR SALE: National 50 rotary drilling rig, NKU Waukesha engines, new Lee C. Moore 130′ 515,000# capacity mast with substructure, new 7¼ x 14 Gardner Denver pump, good drill pipe, everything complete and in first-class condition. H. Waggoner Drilling Co., Box 4657, Oklahoma City, Okla. Phone 64-1413.

Gaso Duplex 4½″ x 6″ Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

NEW A.P.I. COUPLINGS

1618 2″ 10 Round Thread Non-Upset Tubing Couplings
50 5½″ 10 V Thread Casing Couplings
98 7″ 10 V Thread Casing Couplings
2 7″ 8 Round Thread Casing Couplings
76 6⅝″ 8 Round Thread Casing Couplings

Rock Island Oil & Refining Co., Inc.
321 West Douglas Wichita, Kansas

STEEL STORAGE TANKS

6—80,000 bbl. 117′ x 41′ 10″
6—55,00 bbl. 114′ 6″ x 30′ 5″
3—37,500 bbl. 95′ 5½″ x 30′ 4½″
3—25,000 bbl. 78′ x 29′ 4″

All steel cone roof, suitable re-erection Tanks standing location Texas Co.'s former refinery, West Dallas, Texas. Full particulars furnished on request.

ROGERS & WRIGHT, INC.
Wright Bldg., Tulsa, Oklahoma
Ph. 5-3219

MID-STATES PIPE & SUPPLY CO.
Box 2534, Tulsa, Oklahoma
Ph. 2-9128

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: Two 6-cylinder Hydraulic casing pulling machines. One 7″, 5″, 3″, seven foot jacks; one 5″, 3″, four foot jacks. Box E-128, The Oil and Gas Journal, Tulsa, Oklahoma.

WELL EQUIPMENT: New and used spudders, rotaries, core drills — all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools. Everything for Well Service. Pressey & Son, Pueblo, Colorado.

4—175 H.P. 185# W.P. Heine Water Tube Steam Boilers. Exceptionally good. Bourland Supply Co., Pampa, Texas.

NEW DRILL PIPE: 11,000 ft. string, new grade D 16.60 lb., range 3. Internal flush, external upset. Plain end for flash weld tool joints or can be shopped for casing use. Box E-129, The Oil and Gas Journal, Tulsa, Oklahoma.

NEW PIPE
(Available Immediate Delivery)

5400′ 8″ O.D. x 10 gage Electric Weld Pipe, 40′ lengths, plain ends. Tested 490# PSI. Located Compton, Calif.

MID-STATES PIPE & SUPPLY CO.
Ph. 2-9128, Tulsa, Okla.

EQUIPMENT FOR SALE

PIPE
ALL SIZES; LINE PIPE AND CASING, TANKS, AND OILFIELD SUPPLIES. EDCO PIPE & SUPPLY CO., PHONES 933 OR 1298, DRUMRIGHT, OKLA.

FOR SALE: Ideal slush pump, Model C-150. Melton Supply Company, Seminole, Oklahoma.

FOR SALE, LEASE OR TRADE
Ideco rig, complete, good for 7,000 feet. Now in Canada. ORchard 1-3514, Inglewood, Calif.

We have the following described good used pipe near Reed City, Michigan, for exchange for similar pipe in the vicinity of Midland, Texas:

2″	64,576 Feet
3″	20,963 "
4″	24,915 "
5″	3,019 "
6″	52,130 "
8″	7,083 "
10″	2,265 "
12″	5,464 "
15″	783 "
24″	1,046 "

If interested, contact

ANCHOR GASOLINE CORPORATION
714 Atlas Life Building, Tulsa 3, Okla.
Telephone 54-3201

FOR SALE
Desirable Oil Well Casing and Tubing

Texas area	St. Louis area	Description
2,665′		2⅜″OD 3.65# Used Lapweld, 11½ V-Thd. Range 1 Line Pipe
	7,600′	2⅜″OD 4# Used Lapweld, 11½ V-Thd. T & C Tubing.
	6,200′	2⅜″OD 4.6# Used Lapweld, 11½ V-Thd. T & C Tubing.
12,000′		2⅜″OD 4.6# Once-Run Seamless Range 2 10 Rd. Thd. Tubing.
2,104′		3½″OD 9.2# Used Lapweld, 11½ V-Thd. T & C Tubing.
4,441′		5½″OD 14# Used Lapweld, 11½ V-Thd. T&C Casing.
3,400′		5½″OD 15# Used Lapweld, 11½ V-Thread T&C Casing.
2,198′		5½″OD 17# Used Lapweld, 11½ V-Thread T&C Casing.
27,330′		7″OD 17# Used Lapweld, 10 V-Thread T&C Casing.
1,400′		7″OD 20# Used Lapweld, 10 V-Thread T&C Casing.
340′		8⅝″OD 24# Used Lapweld, 8 V-Thread T&C Casing.
844′	480′	10¾″OD 32# Used Lapweld, 8 V-Thread T&C Casing.

SUBJECT TO PRIOR SALE

75,000′ 2¼″OD X Approx. .140″ Wall, 3.2# Recond. Seamless Tubing, P.E., 14′ & Over, Tested to 1000# p.s.i. (Excellent substitute for 2″ Flow line).

THE ABOVE QUANTITIES MOVE RAPIDLY, AND THOUGH YOUR SPECIFIC REQUIREMENTS MAY NOT BE LISTED ABOVE, DO NOT HESITATE TO PHONE COLLECT SIDNEY 1791.

A. J. STRUBEL, Broker

SIDney 1791 (Day Phone) HUDson 8152 (Night Phone) 4946 Murdoch, St. Louis, Mo.

EQUIPMENT FOR SALE

FOR SALE — Bucyrus - Erie Model 28-L Spudder, equipped with dual - tired semi-trailer mounting, casing tackle strut, tool crane. Waukesha gas-gasoline engine Model 6MZA. Machine complete with drilling tools, small tools, casing tools, good drilling, sand, and casing lines, flooring, section house, light plant, etc.—Price $15,000. Complete inventory furnished on request. J. W. Lang Co., 162 West 12th St., Holland, Michigan.

WILSON - TITAN draw works unit and compounding transmission on sub base with 40" Parkersburg Hydromatic brake package, plain cathead drillers side, American Simplomatic break - out cathead opposite driller's side. A bargain at $4,000. Altus Drilling Co., Oklahoma City, 3-2331.

CASING PULLING CONTRACTORS with Hydraulic Equipment: Experienced operators—Pull any size pipe, anywhere. Also will buy wells for salvage. GENERAL CASING PULLING CO., P.O. Box 4357, Oklahoma City. Phone 6-1335.

FOR SALE: Bucyrus-Erie 36L Skid type Waukesha powered. Complete five and seven inch drilling tools, steel tool house, Kohler light plant, New ⅞ X 4500 Drilling line, ⅞ X 4500 sand line, ⅞ X 450 tubing line. Complete set rod and tubing tools, good timbers, and flooring, steel dump box, and steel tool rack. Rig is in A-1 shape and running at present time. Can give immediate delivery. Two Wilson rod and tubing units, single and double drum, with telescoping poles, complete with all tools and mounted on trucks. Crew cars to go with each unit. Both units fully equipped and in A-1 shape. Guss Irvin Well Servicing Co., Box 112, Stinnett, Texas. Phone #1.

EQUIPMENT FOR SALE

SULLIVAN 200, mounted on Mack tandem truck, 45 foot mast, 5 X 8 Gardner-Denver pump. Rig powered by two Industrial 12 Chrysler engines 140 hp. each, vee belt drives, automatic chuck, hydraulic pull down, 26 foot Kelly, swivel, hoses, breakout tongs, and many other tools including about 1000 feet of drill pipe. Rig had $8000.00 in new parts put in it recently. Excellent condition. $15,000.00. Now operating in eastern Nebraska. Omaha Drilling Co., 624 Service Life Bldg., Omaha, Nebraska.

BIG SALE CABLE drilling and fishing tools. 25 complete strings, 75 stems, 100 bailers, 7—drilling motors 110 to 185 H.P. Hurry get your choice now. TRI STATE Supply Co., Box 827, Phone 7-5121, Parkersburg, W. Virginia.

2500 4½" O.D. recessed steel couplings, 1,000 12¾" O.D. recessed line pipe couplings, also 100 16" O.D. line pipe couplings, all used but cleaned, reasonable. A. A. Gilbert Pipe & Supply Co., Shreveport, La.

FOR SALE—Allis-Chalmers Model "U-E" Double Drum Winch Tractor with Rubber Mounted Gin Pole complete with tools for 7500-ft. tubing job. Dirks Brothers, Tulelta, Texas.

WAR SURPLUS EQUIPMENT

2½ to 25 Kw Light Plants, Byron Jackson Pump Units, Gaso Pump Units, Hale Fire Pump Units, Stewart-Warner Heater Units, Benson Portable Power Hoist, Victaulic Pipe Couplings & Fittings, Mobilift Fork-lift Trucks, New Wheatley 4" & 6" Gate Valves 500 WP. Write for listing—H. A. McCarthy, 310 Thompson Bldg., Tulsa, Oklahoma. 5-3296.

EQUIPMENT FOR SALE

LIKE New Bignall Keeler Pipe machine, 2" to 8" inclusive, 20 hp. G.E. Motor, lots of dies, $2800.00. Crane #1424 2" to 10", full set of dies, used very little, $2500.00. McLaughlin, 3506 West Pikes Peak, Colorado Springs, Colorado.

TWO Oil Accounting Machines in good condition. Robert C. Giuff, 304 Wood St., Pittsburgh 22, Pa.

FOR SALE: 20,000' 4" o.d. 6.2 lb. seamless lipe pipe. Plain end, random lengths 30 to 35'. This line was carrying from 100 to 250 lbs. pressure when removed. An antirust coating has been applied. It is clean, straight, beveled and ready to lay. Price 75 cents our yard. M. J. Regan, Phs. 448 and 3892, Coffeyville, Kans.

NOTICE TO BOOSTER Station Owners, Operators, and Repair Service Co.'s Fourteen (14) Sets, Pistons and Liners for Cooper Bessemer Compressor, Thirteen and one-half inches by thirty-six inches, (13½" x 36"). Also 6000' three inch o.d. Seamless Tubing. Further information Call 23746, or Write A. T. Excell, Ball, La.

FOR SALE

Erected in Madison, Kansas, a quantity of 16 ft. diameter by 8 ft. high wood production tanks. List upon request. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

FOR SALE: 90 H.P. 800 R.P.M. Diesel drilling motor, rebuilt, ready to go. Price $1,000. Contact W. R. Hall, Grand Junction, Colorado.

DRILLING Mud. Colo. Bentonite, it swells, it jells. Few equal, none better. Send for sample. Our price $25.00, per ton job. Our new mill saves you money. Pressey & Sons, Pueblo, Colorado.

Casing—5½ and 7" No. 1 grade lapweld and seamless

Tubing—2, 2½ and 3" regular and upset

Water Well Casing—5⅝" and 6¼" attractively priced.

D. A. MORITZ CO.
9th & B&O, Braddock, Pa.

1600 feet 10¾" OD 40.5# 8RT Seamless Casing R2
1800 feet 10¾" OD 45.5# 8RT Seamless Casing R2
1200 feet 13⅜" OD 54.5# 8RT Seamless Casing R2

FRANK MORRIS & COMPANY
TUBULAR PRODUCTS
424 So. Cheyenne, Tulsa, Okla. 2-6247

NEW CASING COUPLINGS

(Immediate Delivery)

569—5½" N-80
799—5½" J-55 Long T&C
829—5½" J-55 Short T&C

All Seamless API, 8 rd. thread. Located Ft. Worth, Texas, and Great Bend, Kansas.

Mid-States Pipe & Supply Co.
Ph. 2-9128 **Tulsa, Okla.**

SPECIAL OFFERING!

LINE PIPE

50,000' 7" O.D. X 17# Excellent Grade Used Lapweld Pipe, Range 1, Either Threaded and Coupled with 10 V-Thread or Plain End, Ready for Welding.

IMMEDIATE DELIVERY—SUBJECT TO PRIOR SALE
THIS IS AN EXCELLENT SUBSTITUTE FOR EITHER 6" or 8" LINE PIPE.

For Full Details Contact

A. J. STRUBEL, Broker

SIDney 1791 (Day Phone) HUDson 8152 (Night Phone) 4946 Murdoch, St. Louis, Mo.

26" O.D. STEEL PIPE

Approximately 6,000 ft. 26" Steel Pipe .312 wall thickness, weight 85.73 lbs. per ft. Electric welded, used, lengths 40 to 50 ft., ends beveled. Recently recovered from a high pressure natural gas line, operated at 500# pressure. This is good pipe located in our Kansas City yard. Available immediate inspection and shipment.

CAST IRON GATE VALVES

We have just completed facilities and machine tools for reconditioning valves. Appr. 400 tons of all sizes from 3" to 24" Cast Iron Gate and Globe Valves, entirely rebuilt, tested and guaranteed. Now offered at great savings. Send us your inquiries and stock up while large range of sizes are still in stock.

CAST IRON PIPE

2,000'—24"—B&S 150 Class
1,500'—18"—B&S 200 Class
2,160'—14"—B&S 200 Class
454'—12"—B&S 200 Class
288'—10"—B&S Class, 200
625'— 8"—P.E. Class, 150
123'— 8"—FLG Class, 150
351'— 6"—P.E. Class, 150

Also large inventory of Cast Iron Fittings; Bell & Spigot type and Gate Valves. All Cast Iron Pipe recently removed from a water line and in good usable condition, located our Kansas City yards.

WRITE—WIRE—PHONE

BROWN-STRAUSS CORP.

1546 Guinotte. Phone HA. 1900 **Kansas City 10, Mo.**

EQUIPMENT WANTED

40 SETS Tool Joints, first class condition, used Acme or API, for 2⅛" drill stem, 8-thread regular. Sutter Well Works, P. O. Box 156, Pass Christian, Miss.

Seamless Pipe, 6000 ft. 8⅝" o.d., 27 to 30 lbs. per foot. 5000 ft., 7⅝" o.d., 25 to 29 lbs. per foot. 1000 ft., 10¾" o.d., 35 to 40 lbs. per foot. 1000 ft., 12¾" o.d., 43 to 49 lbs. per foot. Jim Blevins: Implement Co., Phone 894 or 554, Carrollton, Missouri.

WANTED: Good used well drilling equipment. Spudders, rotaries, large or small. Tools and general equipment. We distribute throughout the West with hundreds of customers. Pressey & Son. Pueblo, Colorado.

REAL ESTATE

FOR Lease or sale: 6000 square foot building, Odessa, Texas, on Highway 80, suitable for offices and/or business space. Very desirable location. Box 2746, Odessa, Texas.

REAL ESTATE

FOR SALE: All structural steel Buildings. 56′ x 80′ x 14′—32′ x 97′ x 12′—33′ x 22′ x 12′—2—12′ x 20′—8. Located Ada, Oklahoma. C. F. Smith, Mayo Building, Tulsa, Oklahoma.

LIST of land owners, address, approximate number of acres and location in Val Verde County. If interested the cost is $10.00. Douglas L. Smith, 304 Central St., Del Rio, Texas.

HELP WANTED

FOREIGN openings: Shot Hole Driller and Automotive Maintenance Mechanic openings in geophysical department of major oil company in Venezuela. Family allowance granted married employees. Initial assignment for two years. For further information write Box 801, Tulsa, Oklahoma, stating experience and qualifications.

WANTED: Experienced finance man who has contacts with Capital oil investors. Have most unusual opportunity for good investment. Give full details in reply. Anglo-American Co-Operative Oil Co., 69 West Washington St., Chicago, Ill.

GEOPHYSICIST: Aggressive, well integrated strong independent company with comprehensive geophysical program desires geophysicist, 35 to 40 years old. Must have considerable experience, prefefably with company background. Experience in Rocky Mountains, West Texas and Southwest Texas desirable. Duties consist mainly of supervision of contract crews and reanalysis of seismic data. Located in company headquarters but considerable traveling involved. Salary dependent on experience and ability. Write giving full details. Replies held strictly confidential. Box E-120, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANT for Refinery. Experienced in plant and product accounting in Mid-Continent Area. Salary commensurate with experience and training. Write giving full particulars regarding personal history, salary and work experience. Box E-158, The Oil and Gas Journal, Tulsa, Okla.

PROCESS ENGINEER

To be located in Tulsa, Oklahoma, to work on projects in Petroleum and Pero-Chemical field. Operating experience desirable but not required.

Letter should include details of education, experience, family and military status, and salary expected. Personal interview can be arranged.

Chemical Plants Division

BLAW-KNOX CONSTRUCTION COMPANY

Box 1266 **Tulsa, Oklahoma**

WANTED

Pipe Line Superintendent

Large natural gas company located in Midwestern Region needs pipe line superintendent having experience with construction maintenance and operation of large gas transmission lines. Age between 35 and 50. Permanent position. Salary commensurate with experience. Please write giving full particulars of personal background, education, experience, and recent photograph. All replies will be treated with strictest confidence.

Box E-163, The Oil and Gas Journal,
Tulsa, Oklahoma

HELP WANTED

WANTED: PRODUCTION MAN capable of making drilling contracts, buying materials, completing wells, etc.—must be good. Box E-127, The Oil and Gas Journal, Tulsa, Okla.

PROCESS ENGINEER. Recent graduate or chemical engineer with one or two years oil refinery experience desired. Letter should include details of education, experience, family and military status and salary expected. Personal interview can be arranged. Box E-157, The Oil and Gas Journal, Tulsa, Okla.

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00 Oil Industry Mailing List, Box 2603, Tulsa, Okla

GOOD SALARY AND COMMISSION

For PETROLEUM ENGINEERS that can qualify for District Managers for a well established Service Company running BOTTOM HOLE PRESSURE TESTS, taking Bottom Hole oil samples and doing other Field and Laboratory work. Management ready to expand by opening up additional operating points. Applicant must be capable and willing to operate a truck until his district is built up and additional operators required.

Box D-502, The Oil and Gas Journal,
Tulsa, Oklahoma

HELP WANTED

EXPERIENCED Engineer for Gas Lift Installation and Service Work. State Age, Experience and Salary Expected. Box E-151, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

OVERSEAS POSITIONS

E.E.'s, constr, Power & Ind'l plant	$7440
C.E.'s, Industrial Plant	$7440
Chemical Engr., Research Development	$7440
Geophysicist	$7440
Rotary Drillers	$7200
Equipment Inspectors, heavy constr.	$5940
Tractors & Crane Mechanics	$5700

MAINTENANCE SUPPLIES—FEES REFUNDED ON COMPLETION OF CONTRACT

Many other Openings ! ! ! !

UNIVERSAL TECHNICAL AGENCY
154 Nassau St., N.Y.C., New York

WANTED
OIL FIELD ENGINE SALES MANAGER

for Large Well-Known Manufacturer of Diesel and Gas Oil Field Engines

Must be able to handle sales and salesmen for Continental U. S. Willing to travel. Age —45 years. Give experience, qualifications and salary expected.

Write Box E-160, The Oil and Gas Journal,
Tulsa, Oklahoma

OPPORTUNITIES FOR TECHNICAL REFINERY PERSONNEL
for
LARGE INTERNATIONAL OIL CO.

Entertaining applications of graduate chemical, mechanical, structural and electrical engineers for refinery engineering assignments at home and abroad.

Engineers with refinery experience and also recent graduates will be considered.

Box E-143, The Oil and Gas Journal, Tulsa, Oklahoma

WANTED
Production Superintendent

Thoroughly experienced in the manufacture of oil field equipment, to supervise design, development and eventual production of oil well specialty items, i.e., bull plugs, swedge nipples, casing shoes, float collars, etc.

Must have executive ability and be able to assume complete charge of operations.

Write, stating experience, education, age, references. Applications held in strict confidence. Salary open.

Box E-153

The Oil and Gas Journal
Tulsa, Oklahoma

HELP WANTED

WANTED
SEISMIC INTERPRETER

By an American oil company in South America. Must have college degree, preferably in geology, and several years' experience making geological interpretations of other geophysical data such as refraction seismograph, gravity and magnetic.

This is a staff position offering retirement plan and other employee benefits. Write giving age, education, marital status, and full details of past experience.

Box 308-I

Radio City Station
New York 19, New York

HELP WANTED

CHEMICAL Engineer with experience in laboratory and process control. Maximum age 35. Send references, education, salary expected and snapshot in first letter. Location Western Canada. Box E-145, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Geologist with approximately 4 years experience for employment by aggressive and expanding oil company. Headquarters Tulsa, Okla. Box E-144, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEER

Chicago Area major refinery has opening for graduated engineer with experience in refinery drafting and design. State age, qualifications and salary desired.

Box E-153

The Oil and Gas Journal, Tulsa, Okla.

HELP WANTED

WANTED
Chief Engineer

For expanding natural gas transmission company located in Midwestern Region desires Chief Engineer for the organization, supervision and control of company's engineering department. Must be experienced in the natural gas field, including compression, transmission, and measurement. Permanent position. Salary commensurate with experience. Please write giving full particulars of education, past experience and recent photograph. All replies will be treated with the strictest of confidence.

Box E-163, The Oil and Gas Journal,
Tulsa, Oklahoma

ENGINEERS

For Career Employment in
FOREIGN SERVICE

A large Petroleum Company operating overseas, has positions for mechanical and process engineers in refinery engineering, maintenance and technical service work.

These positions call for graduate engineers—recent graduates or up to 10 years experience in the fields of mechanical and chemical engineering. Up to 35 years of age, salaries in line with experience.

Replies will be kept confidential. Write giving full details to

Box E-156
The Oil and Gas Journal
Tulsa, Oklahoma

WANTED
ENGINEERS
by
An American oil company in South America

REFINERY ENGINEERS—College degree and several years' experience in oil refinery design or maintenance required.

PIPELINE ENGINEERS—Must be graduate engineer and have approximately 10 years' experience in design, maintenance or operation pump stations, terminals, trunk pipe lines.

MECHANICAL ENGINEERS—Must have Mechanical Engineering degree and several years' experience preferably in oil field operations. Should have knowledge oil field installations, pipeline equipment and pumping operations.

EQUIPMENT INSPECTORS—Graduate engineers with minimum of four years' experience in oil refinery inspection.

CORROSION ENGINEERS—Degree and minimum of five years' experience in corrosion engineering required. Must be able to investigate and recommend solutions to corrosion problems involving land and marine pipelines, tanks, marine equipment, and other mechanical equipment.

Write giving complete address, marital status, education, and complete experience resume.

Box 308-G
Radio City Station
New York 19, New York

SITUATIONS WANTED

CHEMICAL Engineer—Varied pilot plant, process, supervisory experience. Process engineer petroleum refinery last 6 years. Age 38. Earl A. Kraft, 632 Harrison St., Oak Park, Illinois.

SUPERINTENDENT with years lumber experience wants connection in Spanish Speaking country. Have supervised dismantling, rebuilding and operating of logging, railroad and manufacturing operation employing 500 men. No military status. Box E-142, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER
Eleven years varied experience with major oil company—Kansas, Oklahoma, Texas, New Mexico, Louisiana and Wyoming. Desire connection with established independent operator or sound small company. Presently employed in responsible position, prefer Tulsa location. Box E-150, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST desires return to foreign employment. Total of 22 years foreign experience. Last 13 years in Latin America with major oil company; previous 9 in Near East. Box E-139, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

CIVIL ENGINEER and surveyor, graduate, several years experience oil industry. Will train. Box E-134, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER: (B.S.), eight years' experience, desires responsible position Gulf Coast area.—Box E-130, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER: M.S. Degree, ten years diversified experience in Refining and Natural Gasoline. Age 35. Desire responsible position in Refining, Petro-Chemical or Sales. All replies considered. Box E-162, The Oil & Gas Journal, Tulsa, Oklahoma.

FORMER Independent Oil Operator ten years, with legal education, plus eight years Wall Street experience, desires connection raise funds exploratory well drilling from excess profits taxpayers. Box D-938, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL ENGINEER: 8 years experience in petroleum industry including pilot plant, process engineering and refinery operations. Experience with conventional refining units and fluid catalytic cracking. Location preferred: East Texas, Oklahoma or Kansas. Presently employed. Box E-155, The Oil and Gas Journal, Tulsa, Oklahoma.

CIVIL ENGINEER and surveyor, graduate, several years experience oil industry. Will train. Box E-134, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

EXECUTIVE SECRETARY
offers exceptional training and experience to top-flight oil executive in Oklahoma or Texas. Have served as official court reporter and administrative assistant with supervisory experience. Able to handle correspondence and meet all kinds of people. Man, 35, single, two years college. For personal interview write Box 141, Bristow, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 131, Ph. No. 131, Hobbs, New Mexico.

MATERIAL CONTROL, Inventory, Purchasing and Liaison Executive Assistant. General knowledge of Production and Drilling. Available soon. Box E-126, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

LOCAL CAPITAL FOR
production, producing royalties, over-rides, oil payments, drilling deals, working interests, large or small. Must have merit. Prompt action. Give full details. Box E-161, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCING ROYALTIES
WANTED
ANY AREA

BERN SECURITIES CO., INC.
111 Broadway New York 6, N. Y.
WOrth 4-7546

LEASE AND DRILLING BLOCKS

FOR SALE: 640 acres Big Horn County, Wyoming (very hot); 20,000 acres in Central and Eastern Montana (scattered counties); 20,000 acres, North Dakota; 30,000 acres, South Dakota; 10,000 acres, Colorado; 30,000 acres, Nebraska (scattered counties). Prices and terms to properly interested parties. Dyer O.J. 1635 Champa St., Denver, Colorado.

WILL DEAL 6400 acres 10 year oil and gas leases. Located in 5 W.—19 S. of Sierra County, New Mexico. Altitude and Latitude comparable to Artesia pool. Near R. R. and Highway. No tests of importance ever drilled near. O. S. Fierbaugh, P. O. Box 1396, Albuquerque, New Mexico.

OIL LEASE—185 acres near DeRidder, Louisiana Beauregard Parish encircled by Major Companies recent block. Interesting prospect to right party. A. Dickinson, Lake Arthur, Louisiana. Gen. Delivery.

FOR SALE: Have several nice leases in Shelby County, Texas. In Humble and other major Company blocks, lots of activity. Brokers invited. Write for information. C. A. Parker, Center, Texas.

DRILLING DEALS WANTED: Reliable independent operator desires to take ½ interest in good drilling deal, also interested in purchasing good settled production. Send full particulars Box E-155, The Oil and Gas Journal, Tulsa, Okla.

6,500' 5½" 15.5 lb. J-55 Long T&C casing available for interest in producing oil or gas well. Box E-146, The Oil and Gas Journal. Tulsa, Oklahoma.

S. E. NEW MEXICO
A great potential Permian oilfield is indicated in SE Roosevelt County. Immediate drilling underway. Limited royalty & lease holdings to be had on structure. Details upon request.

W. J. PETERMAN, GEOLOGIST
Portales New Mexico

LEASE AND DRILLING BLOCKS

WE DESIRE to farm-out part or all of 28 drilling locations in proven area for good shallow production from four different sands in Smackover field. Block of acreage is reasonably near Buck Turner's new well (340 barrels, 42 gravity from 2935'). Farm-outs will require drilling to 3150' and will carry all deep rights. If interested contact us at once. Cobb Oil Co., 717 Pyramid Bldg., Little Rock, Ark. Tel. 2-4655, 3-1823.

FOR SALE: Two leases in Kansas. 264 acres. One on flood. Average daily production 16 bbls. Write Box E-154, The Oil and Gas Journal, Tulsa, Oklahoma.

BLOCK of 3,600 acres in New Mexico. Geological reports favorable. Correspondence invited from Parties interested in developing this acreage. Zeke Morse, 2325 So. Spaulding, Los Angeles, Calif.

FOR SALE: Oil and Gas Leases adjoining producing leases, also wildcat leases, Drilling propositions and small producing properties; all in shallow territory. W. P. Harley, Bowling Green, Ky.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
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AVAILABLE FOR LEASE: Centrally located office and commercial building, over 26,000 square feet, for long term lease. Steam plant. Parking available. C. B. Lynch, 303 South Cincinnati, Tulsa, Okla.

McKnight Named to High Post of Chain Belt Co.

Chain Belt Co., Milwaukee, has elected L. B. McKnight to the newly created position of executive vice president.

McKnight has served in various managerial capacities since joining the company in 1927, and has been a vice president and director since 1948.

Chain Belt operates plants in Milwaukee and west Milwaukee, and Springfield and Worcester, Mass. Executive headquarters are located in Milwaukee.

O-C-T to Manufacture New Steel Ring Gaskets

A new source of supply on A.P.I. steel-ring gaskets for manufacturers in the Southwest was made available recently when Oil Center Tool Co. began commercial production of the gaskets at its Houston plant.

O-C-T A.P.I. ring gaskets are quality controlled from rough stock to delivered product. The entire manufacturing process is under careful laboratory control to insure that only metals with the proper brinell hardness will be used in manufacture. Frequent micromatic inspections are made to insure true radius and close tolerances on pitch diameters. The rings are cadmium plated as a safeguard against corrosion and are carefully packed for shipment to protect sealing surfaces against damage.

A complete size range of A.P.I. ring gaskets will be manufactured by O-C-T, and will be distributed through oil-field supply stores and other industrial-distribution outlets.

Allied Metals to Represent Cooper Alloy in Texas

Jack Victorine, general sales manager, Cooper Alloy Foundry Co., Hillside, N. J., has announced the appointment of Allied Metals, Inc., as Texas distributors of the Cooper Alloy line.

Allied Metals has been serving the Houston area for the past 19 years with such products as United States Steel sheet and plate, Ladish forged fittings, Kaiser aluminum, Alan Wood clad metals and National Tube stainless piping.

Bailly, Capriles, Walker Talk to Los Angeles Nomads

Speakers at the May Los Angeles Nomads meeting, shown in the left picture, were: Florent H. Bailly, Petroleum Engineering Associates; and Gilberto Capriles, Southern California Consul for Venezuela. At extreme right, Walter Elliott, Jr., foreign guest, member of Santa Fe Drilling Co. In the right picture, new members inducted were: C. Edward Van Loozen; Robert Gaylord; E. B. Fowks, who inducted the new members; Paul Brown, and Dante Syracusa.

Florent H. Bailly, Petroleum Engineering Associates, Inc., and Pantepec Oil Co.; Consul Gilberto Capriles of Venezuela; and Murray Walker, Lane-Wells, were the principal speakers at the May 9 meeting of the Los Angeles Nomads, which was presided over by Lee Laird, Baash-Ross Tool Co.; and Bill Sargent, Sargent Engineering Co.

Bailly discussed relations with the Venezuelans and the means whereby oil could be used as a bond in Western Hemisphere solidarity. Capriles, with 16 years of foreign service for his country in Austria, Mexico, and now Los Angeles, described the physical and geographical features of his country as compared with other nations. Walker, just returned from a trip for Lane Wells throughout Latin America, gave a capsule picture of business possibilities in each of the South American nations.

New members inducted into the Nomads by Ernie Fowks were: Robert Gaylord, Wagner-Morehouse, Inc.; and C. Edward Van Loozen, Webb Wilson Oil Tools. New associate members are Paul Bowen and Dante Syracusa, both of S. R. Bowen Co.

Walter Elliott, Jr., Santa Fe Drilling Co., a foreign guest, attended the meeting. Domestic guests were Dave Carnahan, Emsco Derrick & Equipment Co.; R. A. Powell, Santa Fe Drilling Co.; and "Curly" Working, retired oil man.

General Controls Names Day to Engineering Post

General Controls, manufacturer of automatic pressure, flow, level, and temperature controls, has appointed Robert L. Day to the position of factory sales engineer. His headquarters will be at the Glendale plant.

Day will assist branch office personnel by handling technical inquiries from customers concerning heating, industrial, and refrigeration controls made by General.

Day was previously associated with Southern California Gas Co. and James Graham Manufacturing Co.

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LEGAL

SEALED BIDS will be received until 2:00 P.M., Mountain Standard Time, June 27, 1951, and opened at that time in the office of the Superintendent of the Pine Ridge Indian Agency, Pine Ridge, South Dakota, for the leasing of 3520.00 acres of allotted Indian lands, located in Shannon County, South Dakota, for oil and gas mining purposes. More detailed information may be secured by contacting the Superintendent of the Pine Ridge Indian Agency, Pine Ridge, South Dakota.

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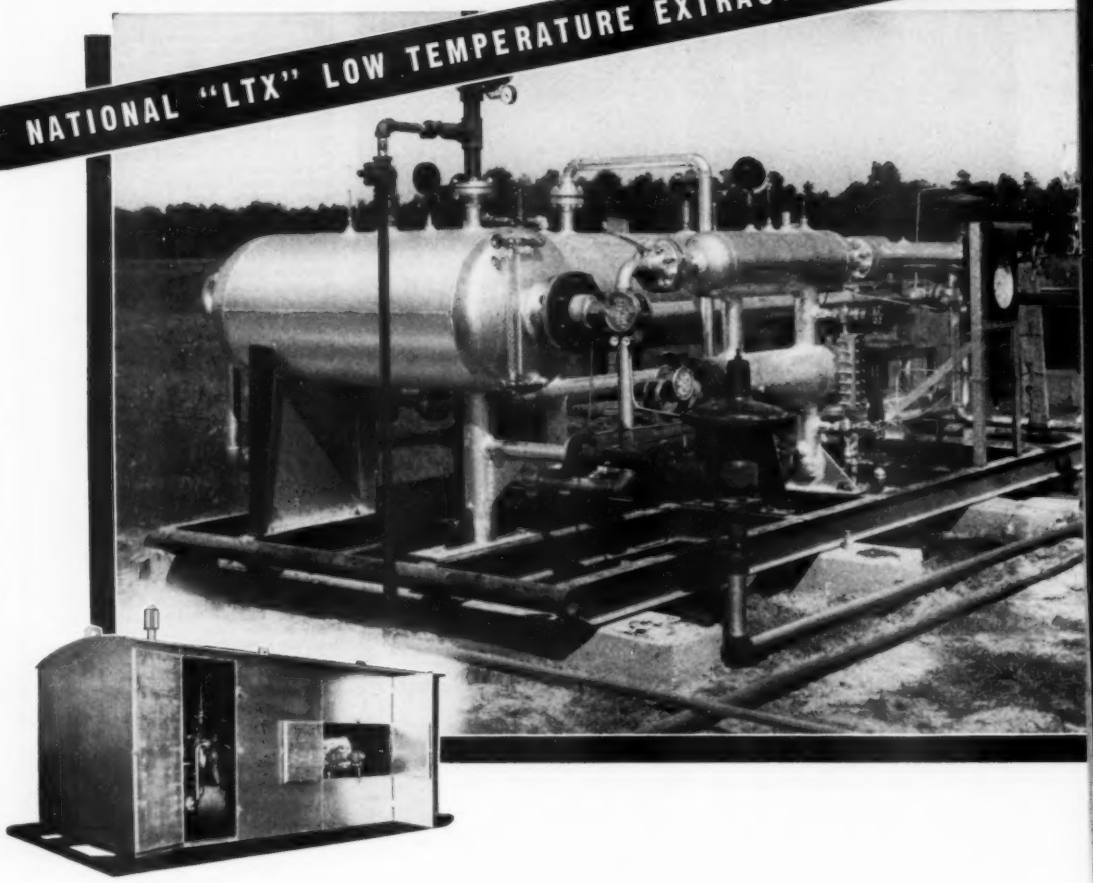

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TULSA, OKLAHOMA

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Such a decisive action was fought at Augsburg, South Germany, in 955 A.D. Swarming out of Asia, savage Magyars overran the rich Danube Valley. They ravaged the prosperous lands of Germany, Italy and France. At last, under Otto, King of Saxony, the armored Knights of Christendom rallied. They faced a hundred thousand fierce foes. The battle raged all day. Thousands were slain. At last the tide turned and the Magyars fled. For three days the Knights pursued the scattered enemy, killing or capturing thousands more. Symbolic of the west's predominance in weapons and armor of iron and steel, victory was credited to King Otto's iron-tipped Holy Lance.

Augsburg ended the Magyars' attempts to conquer Europe. They settled down to peaceful living in their valley and within 50 years accepted Christianity. Again, history demonstrated the truism that no people or alliance can establish supremacy unless it first predominates in the production and use of iron and steel.

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